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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Ninety Years of Science

THE British Association for the Advancement of Science has just published a retrospect of its career (1831-1921) prepared by O. J. R. Howarth, the secretary (pp. 255, appendices and index pp. 63. 7s. 6d.). The volume gives a well-printed and pleasantly written account of the foundation of the Association ninety years ago and its subsequent progress. The early history of the Association is well described, and many instances are given of the methods adopted to encourage research, to interest the public in science, and to stimulate the Government to promote science and avail itself of scientific knowledge. There are excellent portraits of some of the leaders in this great period of English science, the age of Murchison, Huxley, Darwin, Tyndall, Sedgwick, Kelvin, Crookes, Ramsay, and Rayleigh; and there is a list of the Annual Meetings of the Association, with very short biographical notes of some of those who have been conspicuous figures at the meetings. It is a good thing to read this book as a record of facts, and afterwards to reflect on the changes which have taken place during the last two or three generations. The author does little to guide us as to the present and future; his book attempts but little help in the consideration of the present methods for the Advancement of Science, and the reader who is interested in this large subject will be reminded of the existence of the problem, but will receive little guidance or advice as to what is to be undertaken in the altered circumstances.

Fifty or a hundred years ago, geology, natural history, chemistry, and physics were in their infancy; they were growing rapidly and were beginning to be of practical importance. In those days a business man could acquire in his spare time a good knowledge of some one or more of these sciences. Prestwich the geologist, Spence the entomologist, and Lubbock the naturalist spent a large part of their lives in dealing with affairs not connected with science. Green, at Leeds, in the seventies, was engaged in teaching geology and mathematics. In those days a man might easily have a competent knowledge of the natural sciences. The important principles underlying these were being elucidated, and no very advanced training was necessary to enable a curious reader to understand the discoveries which were being so rapidly made. This is no longer the case. An amateur can yet get a great deal of pleasure out of geology, but the geological discoveries of the day are usually so difficult and are described in so obscure a language that he can hardly follow them. So, too, of the other sciences. They have not only become specialised; they have become difficult. The public could be interested in the discovery of mauve; only an expert cares anything about a new indanthrene dyestuff. The newspapers and the technical journals make public almost all the discoveries which the man in the street is interested in, and, though the principles of science are now well diffused, modern science is losing its hold on the public. In chemistry this is very noticeable; as this science becomes of increasing importance and value, the problem of applying it for the benefit of the community becomes more and more difficult to explain and to understand. The British Association or the Society of Chemical Industry must take up this question and do its best to make the public take a greater interest in the progress of chemistry.

Disposal of Effluent Liquors

THOSE who have had experience of the operation of ammoniacal liquor stills know full well of the difficulties which so frequently arise in connection with the treatment and disposal of the spent liquor and, more particularly, the highly offensive "devil-liquor." On

the larger works, the spent liquor from the ammonia stills, with its heavy content of insoluble compounds, warrants the introduction of more or less elaborate settling bays and filter-pressing arrangements. It is the small producers, however, who considerably predominate so far as liquor distillation is concerned, and in such cases the expense of elaborations usually puts the latter out of court. "Devil-liquor" in general is dealt with by being run off and passed back to the storage wells, but this common practice presents disadvantages, as will be gathered from the remarks on the subject which recently fell from Mr. Parrish at the Glasgow meeting.

In these columns last week we had occasion (and, we believe, just cause) to criticise the declension, as compared with many previous years, which has occurred in the information provided by the more purely statistical section of the recently published Alkali Works Report. Our disappointment with the one section, however, must not be interpreted as applying to the Report as a whole; for the Chief Inspector and his assiduous lieutenant, Mr. Linder, have served up some reading of outstanding interest in that portion of the Report which deals with the activities of what we may call their research service. Local Authorities, when they start to interfere with private enterprise, are usually a nuisance; but the chemist who has effluent liquors to dispose of must frequently regard these authorities as obnoxious. Nevertheless, the powers that be must be satisfied and obeyed, and Dr. Bailey has gone a long way to indicate the lines upon which pacification should proceed. In the first place we are told that the most objectionable constituent of these spent liquors is phenol. Accordingly, the elimination of this compound before the liquors are finally discharged from the works should certainly contribute towards remedying matters. Phenols may be removed by steam distillation, so that the obvious method with which to attempt their elimination is that of passing the spent liquor down a tower in counter-current with hot fire gases blown upwards by means of a steam injector. Although, however, such treatment undoubtedly effects the removal of the bulk of phenol, it still leaves the liquor with its original colour. The use of carbon dioxide for discolourising has been shown to be ineffective; but the desired effect may apparently be obtained by the addition of a small proportion of mineral acid, the quantity demanded depending upon the thoroughness with which the distillation process is carried to completion with a minimum excess of free lime. It is, at any rate, encouraging to hear from Dr. Bailey that by some such treatment it should be quite possible to produce a deodorised and almost colourless effluent suitable for admission to the sewers.

Returning Trade

APART from the evidence furnished by the Board of Trade returns for June, noticed elsewhere, the testimony of chemical firms, both manufacturers and merchants, consistently points to a slow but steady improvement in trade. Though the attitude towards commitments of any size is still one of caution, business is no longer rigidly confined to "hand-to-mouth" requirements. Sellers and buyers are beginning to see a little way ahead, and with a gradual return of confidence, the volume of business is quietly on the increase. The leisurely pace of the improvement may still try the patience of those who are feeling acutely the effects of an abnormally prolonged "slump," but it is, from every point of view, preferable to erratic ebbs and flows.

The chief difficulty continues to be the disparity in the currency exchanges. For this no immediate remedy has yet been provided; the recovery of something like equal conditions can only come gradually with the restoration of international trade. There is a suspicion that in the case of Germany certain commercial interests find the depreciation in the value of the mark a considerable asset in their export trade, and are not anxious for a too rapid recovery. The view has been expressed to us by those who have access to good sources of information that the fall has been to a certain extent "engineered," and that the movement has now gone beyond the control of those who encouraged it. Another urgent need, in the opinion of observers who have recently studied German conditions on the spot, is a settlement of the reparations problem. The United States, we believe, is not at all as indifferent to the European situation as is often supposed. The American view is that the condition of Europe is primarily a problem for European nations. While quite friendly and anxious to help, America shrinks from becoming entangled in what she regards as largely a domestic difficulty. On one point American students of European conditions are emphatic—a basis for reparations must be definitely settled. They are inclined to think the French attitude too severe—not at all an unnatural attitude in the circumstances. On the other hand, British feeling is regarded as too easy. The right line may be found somewhere between the two. So anxious are some commercial interests to reopen trade with Germany that they would let the Germans off at almost any price, and the warning against excess in this direction seems to us sound. We have taxed ourselves heavily. If the Germans are relieved of burdens they can quite well bear if they choose and of penalties they have fully incurred, we may be guilty of generosity to Germany at the cost of being unjust to ourselves. The handicaps this country has voluntarily accepted already are too heavy for that.

Rejection of the Dye Embargo

THE announcement that the United States Congress has rejected the Dye Embargo and excluded it from the Tariff Bill will certainly cause some commotion among the supporters of the United States dyestuff industry. From opinions recently published in our columns it is clear that considerable importance was attached to the continuance of the embargo, and the decision now announced will be treated as a victory for the pro-German propagandist party. The division was a narrow one, the motion for rejection being only carried by a majority of 36 to 32. It is unlikely that men like Dr. Herty and Dr. Parsons will quietly accept an adverse decision of this kind on a matter which they regard as vital to the future of the American colour industry; but what steps they may take is uncertain at the moment. It may also be that the decision is

more hostile to the form of the embargo than to its substance, and that Congress may prefer to secure the necessary safeguards by other means.

It is clear from returns just issued by the United States Tariff Commission that the American dye industry is by no means as flourishing as the earlier reports of its progress would lead one to expect. For the year 1921 the output of dyes by 74 makers shows a decrease of 56 per cent. on the output of the previous year. The figures as regards actual sales are a little more favourable, indicating that a portion of the accumulated stocks have gone into consumption, but the average price of the dyes sold has declined from $1.08 to 83c. per lb. In the production of intermediates by 107 manufacturing firms the year 1921 shows a decrease in quantity from 1920 of 73 per cent. Similar decreases are reported in colour lakes, photographic chemicals, synthetic phenolic resins and synthetic tanning materials. As against this, "conspicuous progress" is reported in the development of synthetic medicinal chemicals of coal-tar origin and in the production of perfumes and flavours. The causes of the present position are largely the same as those which have operated in this country—namely, the diminution of the export trade in dyes, the large stocks carried over from the previous year, and the general business depression.

Improving Chemical Exports

In spite of the gloomy impression gleaned from statements in the daily Press relating to export trade during June, a closer perusal of the Board of Trade Returns shows that exports of chemicals, drugs, dyes and colours are maintaining that steady upward tendency which became noticeable in April. Leaving out the phenomenally high January total of £2,014,794 the June figure, £1,784,111, is the highest yet recorded this year, and although it is only £36,010 ahead of the May total, which in turn was £130,406 greater than that for April, it is probable that a steady if small advance is more likely to be consolidated than a sudden heavy increase. February was the lowest month, with exports of £1,556,884, while March showed an improvement of £136,089. April saw a set back of £75,278, but this was followed by the £130,406 increase previously referred to. The total exports of chemicals during the first six months of 1922 amounted in value to £10,415,558. This compares favourably with the 1921 figure of £11,035,683, as some allowance must be made for the drop in prices since that period.

The statistics relating to imports during the past month record fairly large increases under acetic and tartaric acids, a moderate increase under potassium nitrate and a slight diminution in the receipt of cream of tartar. On the export side there was a considerable improvement in sulphate of ammonia shipments, while zinc oxide and bleaching powder made a good recovery. Tar oil and creosote was the only heading under coal-tar products which showed any improvement on the May figures. Exports of tartaric acid, ammonia chloride, potassium compounds other than chromate and bichromate, and sodium compounds were all lower as to quantity than in the preceding month.

The Quality of German Chemicals

In a recent number we recorded a remark by Dr. Charles Parsons that the quality of German chemicals produced to-day is considerably lower than that of their pre-war products. Inquiries made in other quarters, both British and American, go decidedly towards confirming this view. In one case a careful comparison was made of the relative degrees of impurity in certain British and German chemicals, and it was found that while the degree of impurity in the British case was about 2 per cent., in the German it was as high as 40, with but little promise of improvement. The cause is not quite clear. Germany may have lost a good proportion of her working chemists in the war; the process of education has for the same reason been arrested and the supply of qualified young chemists restricted; works and plant may have been disorganised; and most of all, in the hurry to expedite production with a view to resuming trade, regard for quality may have been sacrificed. But the truth is, according to good judges, that the German reputation was always some degrees better than the actual performance. Germans in the past have been notoriously skilful commercial advertisers, and they succeeded in gaining for their chemical products a fictitiously high reputation. That has latterly been considerably damaged and the greatly improved reputation of British and American chemicals is a decidedly encouraging feature of the movement for developing the fine chemical industries of both countries.

Points from our News Pages

Special articles are published by Alan A. Pollitt, M.Sc., on "Scale-formation and Corrosion in Boilers," and by John Missenden, B.Sc., on "An Aldehyde Compound and Its Derivatives" (pp. 76–78).

Dr. R. B. Moore, chief chemist to the U.S.A. Bureau of Mines, gives in an interview some opinions on his recent European tour (p. 79).

Reviews are published of a number of recent text-books (p. 80).

At the last meeting of the Oil and Colour Chemists' Association Mr. W. B. Parker strongly urged the appointment of a committee to prepare standard specifications of resins (p. 82).

A further improvement in the exports of chemicals, drugs, dyes and colours, is reflected in the Board of Trade Returns for June (p. 83).

According to our London Market Report markets have shown considerable activity during the past week (p. 93).

According to our Scottish Market Report a fair number of inquiries are in circulation and prices are well maintained (p. 95).

Books Received

The British Association. A Retrospect 1831-1921. By O. J. R. Howarth. London: The British Association. Pp. 318. 7s. 6d.

Chemistry for Beginners and Schools. By C. T. Kingzett. London: Baillière, Tindall and Cox. Pp. 237. 5s.

The Calendar

July 26	Research Association of British Rubber and Tyre Manufacturers. Opening of Research Laboratories by the Right Hon. Lord Colwyn. 3 p.m.	105-7, Lansdowne Road, Croydon, Surrey.
Aug. 12	The Mining Institute of Scotland: General Meeting.	Glasgow.

Scale-Formation and Corrosion in Boilers

By Alan A. Pollitt, M.Sc.

The writer discusses the effect of the impurities commonly occurring in boiler feed-water, and describes the mechanism of the corrosive reactions which are responsible for the deterioration of plates and tubes.

THE study of boiler chemistry has received increasing attention during recent years, and has progressed to such a stage as to merit its consideration as a specialised subject in industrial chemistry. Up to the present time, however, it has claimed the attention of the engineer rather than of the chemist, and it may be for this reason that we find information on this subject scattered in the form of occasional chapters and articles in text-books and technical literature. The amount of information available is considerable, but it still remains to be collected and classified, and published in the form of a standard volume on boiler-chemistry. The subjects discussed below constitute only a portion of the ground included in the term "boiler-chemistry," for if dealt with in full detail they would require far more space than is available here.

When water is heated in a boiler for steam-raising purposes the dissolved gases are driven off with the steam and there remains in the water all of the originally present solid impurities. Some of these become insoluble and are precipitated either as a sludge or as a scale which adheres to the tubes and heating surfaces. Other impurities remain in solution and, as evaporation proceeds, their concentration increases and finally results in the development of other boiler troubles. Reactions occur between the impurities themselves; thus two soluble salts may react to produce an insoluble salt, which on precipitation forms a hard and destructive scale. Or, two comparatively harmless impurities may give rise to a strongly corrosive salt. The modern high-pressure boiler may, in fact, be regarded as a chemical factory in which reactions occur between the dissolved impurities of the feed-water, usually to detriment of the boiler. The behaviour and effects of these impurities will now be considered individually.

Carbonate of Lime

This occurs in solution in natural waters as the bicarbonate. In the boiler it is decomposed and the normal insoluble carbonate is precipitated as a sludge. In this form the salt is at first amorphous; but it gradually changes into the crystalline form and becomes denser, yielding a heavy mud or sludge, but not a scale.

Carbonate of lime scale is produced by the slow deposition of the already crystallised form, and the scale is hard, compact and adherent. It is perhaps the least troublesome and least dangerous of any scale since it is porous and allows the boiler water to penetrate it so that the overheating of plates and tubes is not likely to assume such serious proportions as is the case with harder and impermeable scales. Carbonate of lime scales are also comparatively easy to remove, and, further, in water-softening processes it is always the most readily removed of the dissolved impurities.

Both scale and sludge, then, may be produced by calcium carbonate; and, should priming occur in a boiler evaporating a lime-water, some of the sludge may find its way to other parts of the steam-raising plant and even so far as the engines or turbines. In the superheater the sludge would be decomposed, and it is for this reason that free lime is frequently found in superheater tubes.

The carbonate scales are usually found contaminated with sulphate of lime and magnesia, and often the percentage of these latter is so great that the scale loses all characteristics of a carbonate scale and may no longer be classed as such.

Sulphate of Lime

Sulphate of lime, in the form of the hydrate, is a constituent of most natural waters. Its solubility is greatest at about 110° F., and decreases as this temperature is exceeded. At 260° F. the salt is dehydrated, and consequently there is precipitated in the boiler the anhydrous salt which forms a hard crystalline scale. It undergoes no further change, but accumulates into a solid and impermeable mass. It is never deposited as a sludge, although if the quantity present in the water is small it may sometimes be found in heavy carbonate of lime and magnesia sludges. It may be deposited simultaneously with carbonate of lime if the latter is also present, and a compound sulphate and carbonate scale is produced. With the exception of silicate scales, the sulphate scales are the most destructive and most difficult to remove and are often the cause of the rapid failure and breakdown of boiler tubes through the excessive overheating which they induce. Calcium sulphate is often found in natural waters in excess of the amount indicated by its solubility, and in boiler waters which have been subjected to temperatures above that at which the anhydrous and insoluble form of the salt is produced. It would appear, therefore, that the presence of other soluble salts have considerable influence on the solubility of calcium sulphate. Sulphate or carbonate of lime waters, containing also soluble magnesium salts such as the chloride, nitrate or sulphate, often give rise to magnesia scales in the boilers, the lime salts interacting and exchanging acid radicles with the magnesium salts. Thus, calcium carbonate will give rise to magnesium carbonate, which is precipitated and after undergoing decomposition results in the production of magnesia. The resultant calcium salts are soluble except for the sulphate, and this, of course, is deposited as scale. In this way it may happen that a sulphate of lime scale occurs in a boiler whose feed-water contained no calcium sulphate, and the presence of calcium chloride (which is rarely found in natural waters) in boiler waters may be explained.

In cases of this kind where magnesium carbonate is produced, the chief source of trouble lies in the subsequent decomposition of the salt and the evolution of carbon dioxide, which passes forward with the steam and sets up corrosion in superheaters and turbines, etc., whilst the residual carbon dioxide in the condensed steam may be responsible for corrosion in other units of the water-circulation system.

Carbonate of Magnesia

Like carbonate of lime, this salt occurs in water as the bicarbonate, and is decomposed in the boilers to the normal carbonate and carbon dioxide. A futher change occurs whereby more carbon dioxide is evolved and magnesium hydrate is produced. The hydrate is extremely light and flocculent, and should priming occur it may find its way into the steam pipes and turbines and seriously impair the efficiency of the latter by clogging the steam spaces. In the superheaters and also in high-pressure boilers, the hydrate loses water and becomes anhydrous magnesium oxide. It is usually deposited as a fine sludge, but it is sometimes found as a hard scale when other salts are present, such as sulphate

of lime, which may be regarded as having cemented the magnesia sludge.

Sulphate of Magnesia

The importance of this salt lies chiefly in its reactions with other salts such as sodium chloride and calcium carbonate, which may also be present in the boiler-feed. In the presence of calcium carbonate, magnesium carbonate and calcium sulphate are produced. The latter is deposited as a hard and destructive scale and the former behaves as has already been described. With sodium chloride, the products of reaction are sodium sulphate and magnesium chloride, and it will be seen later that this salt is extremely corrosive and one of the most dangerous constituents of boiler waters.

These two examples illustrate the significance of magnesium sulphate, and it is well to remember that all waters containing magnesium salts in addition to other salts such as chlorides, etc., are potentially corrosive and cause rapid destruction of boiler tubes and surfaces.

Carbonate of Soda

When this salt is present in a boiler water it is not deposited as scale or sludge, but continues to accumulate as evaporation proceeds and often reaches a very high concentration. In such cases extensive corrosion of brass and gunmetal fittings occurs, and the frequent refooting of steam and water gauges is necessitated. In boilers where the pressure exceeds 100 lb., a portion of the carbonate of soda is causticised and caustic soda is produced, the concentration of which rapidly increases. The action whereby caustic soda is formed is not a straightforward one, and is open to a certain amount of conjecture. Carbon dioxide is not liberated but instead an evolution of oxygen occurs, and from this and other available evidence it would appear that the liberation of oxygen accompanies the production of degraded forms of carbonic acid. Sodium formate may, for instance, be first produced, to be in turn decomposed into formaldehyde, which, by polymerisation, is condensed into sugary bodies similar to formose. The fact that many boiler waters will give positive reactions in tests for sugars, supports this sequence of reactions. To proceed farther, the sugars produced, together with the constantly increasing concentration of caustic soda, may set up another series of reactions resulting in the production of such bodies as lactic acid, etc., and acetone, and in the course of which, some sodium carbonate is re-generated from some of the caustic soda, thus completing a continuously acting cycle. Steam from the modern high-pressure boiler is frequently acid in character and causes corrosion in the steam pipes, superheaters, and turbines, and the presence of carbonate of soda in the boiler-water is, in many cases, responsible for this. Further evidence of the complicated nature of the reactions occurring in carbonate of soda waters is to be found in the fact that the condensed steam from these waters rarely contains more than a trace of carbon dioxide, but is almost invariably saturated with oxygen. It is clear, therefore, that the production of caustic soda is the result not of a simple causticisation, but of some reaction in which oxygen is also produced.

Sulphate of Soda

This salt occurs in many waters, and is usually inert. Its solubility decreases beyond 65° F., and for this reason sodium sulphate scales do occasionally occur, though only in boilers where the concentration of the water is allowed to become very high. In cases of this nature, the sodium sulphate is often deposited simultaneously with sulphate of lime in the form of an artificial Glauberite, which may constitute over 90 per cent. of the scale. In the absence of sulphate of lime or other scale-forming material, the sodium sulphate may be deposited alone, and such scales have been known to occur even when the boiler water has not reached the theoretical point of saturation, and it is assumed that the presence of other soluble salts reduces the solubility of sodium sulphate to a very appreciable extent. Analogous cases occur with the very soluble magnesium sulphate. Boilers evaporating water which is far from saturated with this salt have been found to contain a scale consisting of a considerable percentage of this soluble salt. Still other instances are on record of scales consisting almost entirely (about 95 per cent.) of the soluble salts of soda, such as the chloride, nitrate, carbonate, and sulphate. Instances of this kind only occur, however, when the boilers are so worked that the water is allowed to exceed considerably the safe limit as regards the concentration of soluble impurities.

Chloride and Nitrate of Soda

Little need be said with regard to these two salts. The chloride is always present in natural waters but is, itself, generally considered as innocuous; in conjunction with magnesium salts, however, it may give rise to very serious corrosion as will be shown later. Sodium nitrate occurs occasionally in boiler-feeds and may be regarded in a similar manner to the chloride. In the presence of organic matter it is reduced to nitrite.

Calcium and Magnesium Nitrates

Calcium nitrate is present in many waters, and may originate from various sources. In the boiler it undergoes partial decomposition, yielding free lime and nitrite of lime; and it attacks the metal, producing ferric oxide. The presence of organic matter in the water will also give rise to the production of nitrite, and the reduction may be carried even further and yield ammonia. Thus hydroxide and carbonate of lime may be produced in a boiler from calcium nitrate, the free lime imparting alkalinity to the boiler water, and in this way often giving rise to a false sense of security, since it is easily mistaken for soda alkalinity, a little of which is a desirable characteristic of boiler waters. Calcium nitrate is a corrosive salt and attacks the plates and tubes, and is one of the four salts to whose presence the rapid corrosion of plates and tubes is generally due. These salts are calcium nitrate and chloride, and magnesium nitrate and chloride, and they should be regarded as present even though the analysis of the water indicates only the potential salts. For instance, in a case where analysis shows the presence of carbonate of lime or magnesia and sodium chloride, the water should be considered as containing the corrosive calcium or magnesium chloride. The powerful corrosive action of calcium nitrate may be explained as the result of catalytic action, or better by the following cycle of chemical reactions :—

(1) $Ca(NO_3)_2+H_2O=CaO+2HNO_3$
(2) $2HNO_3+Fe \quad =Fe(NO_3)_3+H_2$
(3) $CaO+Fe(NO_3)_2=Ca(NO_3)_2+FeO$
(4) $FeO+H_2O \quad =Fe(OH)_2$

The ferrous oxide is further oxidised by the oxygen dissolved in the water to ferric oxide, and a portion of this oxidation is also effected by further reaction with calcium nitrate, thus :—

(5) $4FeO+Ca(NO_3)_2=2Fe_2O_3+Ca(NO_2)_2$

The hydrogen liberated in the second equation reduces some of the nitrate of lime to nitrite. Magnesium nitrate is in every way analogous to calcium nitrate and is more corrosive. The magnesia liberated by its decomposition is insoluble, however, and does not therefore give the water an alkaline reaction, as is the case with nitrate of lime.

Calcium and Magnesium Chloride

Calcium chloride rarely occurs in natural waters, but it is produced in boilers by the reaction between calcium carbonate and other soluble chlorides. On the other hand, magnesium chloride is frequently found in waters, and it is, perhaps, the most corrosive constituent a boiler water can

contain. Heated in contact with iron it is decomposed by the steam into magnesium hydrate and hydrochloric acid, and this immediately attacks the metal, forming ferrous chloride and liberating hydrogen. The ferrous chloride then reacts with the magnesia, causing the production and precipitation of ferrous oxide and re-generating magnesium chloride. The following equations illustrate the sequence of reactions :—

(1) $MgCl_2+2H_2O = Mg(OH)_2+2HCl$
(2) $2HCl+Fe = FeCl_2+H_2$
(3) $FeCl_2+Mg(OH)_2 = MgCl_2+Fe(OH)_2$

The quantity of magnesium chloride does not diminish, but increases as evaporation goes on, and the nett result of the cycle whereby the metal of the boiler is corroded may be expressed simply as :—

$$Fe+2H_2O=Fe(OH)_2+H_2$$

As the concentration of magnesium chloride increases, the violence of its corrosive action becomes more and more pronounced, and finally this may become so vigorous that the hydrochloric acid is evolved at such a rate that a portion of it is carried away by the steam, to the detriment of the boiler steam spaces and superheaters. The ferrous oxide produced as just described is oxidised, by the dissolved oxygen in the boiler water, to ferric oxide, and a second cycle of reactions is set up whereby the corrosion proceeds independently of the magnesium chloride, being carried on entirely by oxygen dissolved in the boiler-feed water. The ferric oxide acts on the iron with which it comes into contact as shown by the equation :—

$$Fe_2O_3+Fe=3FeO,$$

one molecule of ferric oxide producing three of ferrous oxide, which are in turn oxidised to ferric oxide, and so the cycle proceeds. The liberation of hydrogen during the corrosion of the iron by magnesium chloride is another feature of this class of trouble ; this hydrogen becomes occluded by the metal and renders it brittle, consequently tubes and plates often fail long before actual corrosion has proceeded far enough to warrant a breakdown. The foregoing remarks apply also to calcium chloride, though experience seems to indicate that this salt is not so violent in its corrosive action as is magnesium chloride.

Silica

Silica is soluble in water to the extent of about one quarter of a grain per gallon only. It usually occurs as silicate of iron or alumina, and in alkaline waters it may be present to the extent of six or seven grains per gallon as silicate of soda. Silicic acid is much more soluble, and in certain cases boiler waters may contain a very high percentage of this in the colloidal form. Silicate scale is perhaps the worst form of incrustation that can occur in a boiler. These scales are intensely hard and compact, and are very difficult to remove.

The use of poor quality lime together with soda in softening plants will often result in the formation of a silicate scale. Some limestones contain a considerable percentage of silica, and this remains in the calcined stone. When such lime and soda ash are mixed in the reaction tanks of a water-softening plant, caustic soda is formed, and the silica is dissolved as silicate of soda, which goes forward into the boiler. If the whole of the lime or magnesia is not removed, as may occur from improper control of the softener, the formation of silicate scale will occur in the boiler.

In conclusion, it may be desirable to point out that nothing has been said with reference to the effect of dissolved gases in boiler-feed waters. This is a subject which has attracted increasing and universal attention of late, and it is felt to be worthy of a fuller treatment than is possible here.

An Aldehyde Compound and its Derivatives

By John Missenden, B.Sc.

A LIQUID compound of the aldehyde group that takes a curious form when left undisturbed, and has distinctive peculiarities, is *dichlorinated aldehyde*, $C_2H_2Cl_2O$. It was obtained in the first place by the action of sulphuric acid upon dichloracetal, and its discovery is due to Paterno.

The two features most notable about this compound are : (1) When it is poured into water it displays a great similarity to chloral, sinking to the bottom of the vessel and dissolving, the process being somewhat accelerated by the application of heat ; and (2) even though it is placed in a hermetically sealed flask, it assumes a dense form which finally becomes a white amorphous mass with an outward semblance of porcelain ; and it remains so until it is heated to 120° C., when it is re-converted into a liquid. Its boiling point may be taken at somewhere between 89·5° and 89·9° C. It has the power of absorbing moisture from the atmosphere ; and, when this takes place, it is converted into a hydride. This hydride crystallises with the production of beautiful laminæ. The aldehyde is soluble in both ether and alcohol ; and may be passed over spongy platinum heated to redness, or mixed with oxygen, without undergoing any appreciable change.

If it be heated with a considerable excess of concentrated nitric acid (in the ratio of, say, 5 : 1 by weight), a violent reaction takes place, and the dichlorinated aldehyde is transformed into *dichloracetic acid*, $C_2H_2Cl_2O_2$; the action merely consisting of the addition of one atom of oxygen to the former compound. The equation is as follows :—

$$C_2H_2Cl_2O+HNO_3=C_2H_2Cl_2O_2+HNO_2 ;$$

the other product being nitrous acid.

Hexchlorinated ethylic oxide, $C_4H_4Cl_6O$, is produced by the action of phosphoric pentachloride, PCl_5, upon dichlorinated aldehyde. Upon investigating the change closely, a somewhat interesting conclusion is arrived at. Let it be supposed that two molecules of dichlorinated aldehyde be taken for the change, and the oxygen in one be replaced by a diatomic molecule of chlorine. This done, the equation of the final action becomes :—

$$C_2H_2Cl_2O+C_2H_2Cl_2Cl_2=C_4H_4Cl_6O ;$$

and it will be noted that this is typical of all actions between phosphoric pentachloride and the aldehydes in general. The examination of hexchlorinated ethylic oxide shows that its constitution may be symbolised in one of two ways, viz. :—

$CHCl_2.CHCl.O.CHCl.CHCl_2$; or
$CHCl_2.CH_2.O.CCl_2.CHCl_2$.

The first formula is generally accepted as the correct one, but there are still some authorities who affirm that the second is the more probable.

The compound (a colourless and viscid substance with a specific gravity greater than unity, which is soluble in both ether and alcohol, but insoluble in water) is energetically attacked by alcoholic potassium, and a considerable amount of heat is evolved. Among the products obtained after the addition of water are *tetrachlorinated vinyl oxide*, $C_4H_2Cl_4O$, and potassium chloride. Tetrachlorinated vinyl oxide takes the form of a heavy aromatic oil with a boiling point of 196·7° C. It will be observed that this compound may be expressed by the formula :—

$$C_4H_4Cl_6O-2HCl ;$$

the action being simply the extraction of two molecules of hydrochloric acid from hexchlorinated ethylic oxide. It unites with bromine to form *tetrachloro-tetrabrominated ethylic oxide*, $C_4H_2Cl_4Br_4O$; and here is seen that it is analogous to chlorxethose (perchlorinated vinyl oxide), C_4Cl_6O, in its action. This last-mentioned compound was discovered by Malaguti, who produced it by removing from perchlorinated ethylic oxide ($C_4Cl_{10}O$) four atoms of chlorine.

Dr. R. B. Moore

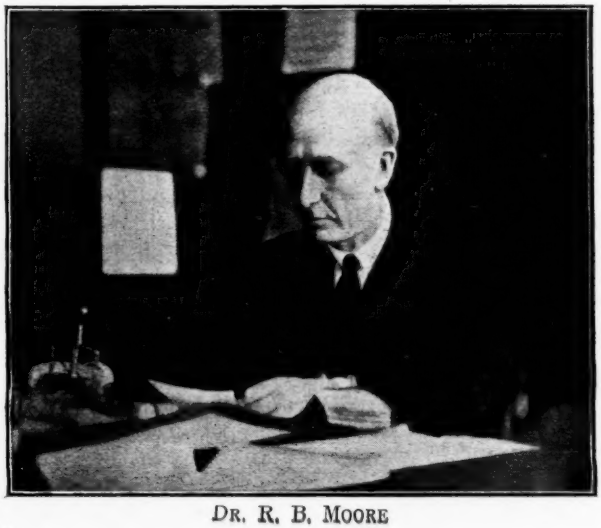
American Research Chemist's Visit to Europe

DR. R. B. MOORE, chief chemist to the U.S.A. Bureau of Mines, who left the United States on May 6, has completed an extensive tour of European countries, and on Wednesday, July 12, left England on his return to the United States.

Dr. Moore's visit was paid on behalf of the United States Army and Navy and the Bureau of Mines, and during his tour he had opportunities of investigating the conditions in the various countries visited and of exchanging information and ideas on several questions both of general and of special interest. He visited Czecho-Slovakia at the invitation of the Government, and went over their radium plant with their officials. While at Prague he delivered three lectures, dealing with helium and radium production in the United States and the technical work of the Bureau of Mines.

While, naturally, not prepared to discuss the nature of his investigations, he appears to have been greatly interested by what he saw during his visit, and left England with pleasant memories of his reception in Europe.

During a short visit paid to THE CHEMICAL AGE on the eve of his return, Dr. Moore expressed some interesting opinions about American conditions. Dealing first with the dyestuffs industry, he said: "The dyestuffs situation is practically this: We have been working under an embargo very similar



DR. R. B. MOORE

in character to the one in force here. That embargo has been extended for one year with the War Trade Board, now the Chemical and Dye Division of the Treasury Department, in control. What will happen after another year is not yet at all certain, but we are hoping that the embargo will be further extended at the end of next year. That is the real problem about which we are concerned. The dyestuff industry in America has undoubtedly proved reasonably successful, and if it is given a fair chance for a few years there is no question about the ability of the industry to hold its own permanently. Our fine chemical industry also has been very considerably developed during the war and since—mainly since—and we are now making some exceedingly good fine chemicals."

With regard to the work of the Bureau of Mines, Dr. Moore pointed out that it is almost entirely done in the public interest. The results of investigations, with very few exceptions, are all available to the public, not only in the United States but in other countries. In fact, a large department is engaged in the work of disseminating this information for the public benefit.

Perhaps nothing has given Dr. Moore more satisfaction than the very striking progress made in research work concerning radium and helium, of which he has personal charge. "As regards radium," he said, "up to 1913–14 no radium was produced in the United States at all. Last year we produced 36 grm. of radium element, which is nearly as much as the whole world outside the United States has produced since the first discovery of radium. The year before that we produced 32½ grm., and up to June of this year there has been produced in the United States about 150 grm. radium element as against 40 grm. for the rest of the world."

Helium at 1½d. per cubic foot

Equally satisfactory progress appears to be made in connection with helium. "At present," he informed us, "we have 2,300,000 cubic feet of helium in cylinders, of an average grade of 95 per cent. Congress is supporting the work in a thoroughly satisfactory way, and we hope to produce next year—July 1, 1922 to July 1, 1923—about ten million cubic feet. Meanwhile, we are doing a large amount of research work with the object of obtaining fundamental information for the building of more efficient plants so that we can reduce the cost of production. We hope ultimately to be able to produce helium at a cost of 1½d. per cubic foot."

In reply to a question as to the commercial effect of such a reduction in cost, Dr. Moore pointed out that the reduction in cost from 4d. to 1½d. a cubic foot would make the commercial use of helium possible on a much larger scale than at present. The main use contemplated for helium in the United States is in connection with airships. In view of the reduced cost of helium a considerable amount of interest is at present being taken in America in the future of commercial aviation, and he regarded it as quite possible to see in the near future very important developments.

Another example of the work undertaken by the Bureau was mentioned by Dr. Moore. "We are working," he said, "in co-operation with the principal brick and tile associations of the United States in a thorough study of the whole question of the burning of brick and tile. This involves a complete investigation of the different types of kilns, methods of burning, the time required for burning, heat interchange, and everything of that kind. We have a staff of four or five technical men on a car in which they live. We send that car to various brick plants which are co-operating with us, and the men take charge of the plants, operate them, and spend about six weeks in experimental work. Up to the present we have succeeded in making a very decided reduction in fuel consumption. The reduction, in fact, averages about 30 per cent. In this and other matters we are working in the closest sympathy with American manufacturers, and such reductions in cost as I have indicated are obviously of great commercial importance to our industries."

Dr. Moore, in leaving, emphasised again the public spirit in which the work of the Bureau is conducted, and the willingness of its staff to supply information and satisfy inquiries from every quarter.

Mr. Muspratt on Chemical Trade Revival

AN all-round revival of the chemical trade is expected in the immediate future by Mr. Max Muspratt, of the United Alkali Company, Liverpool, who has just succeeded Sir John Brunner as chairman of the Association of British Chemical Manufacturers.

"The heavy chemical industry," he points out, "undoubtedly turned the corner at the beginning of the year, and the alkali portion of it, at any rate, has enjoyed real prosperity, shipping to all parts of the world. The acid side of the industry is slowly recovering from the most difficult period in its existence. At every turn the signs are promising. With much better reports from the textile industry, I expect that the dye industry will shortly get a real chance to show what it can do, and I am not afraid of its power of making good.

"There is no branch of the chemical industry in which more excellent work has been done than fine chemicals, and one of the greatest triumphs of the Association of British Chemical Manufacturers has been the manner in which the fine chemical makers have co-operated both with one another and with other branches of the chemical industry. They deserve every kind of support from the public at large, because they are conducting at their works schools of practical chemistry, which are of vital importance to the nation, both in peace and war."

Sir Alfred Mond, Mr. Shortt (the Home Secretary), and Mr. Stanley Baldwin (President of the Board of Trade), were all guests at the annual dinner of the Association, which was held in private at the Holborn Restaurant, London.

Reviews

A Textbook of Organic Chemistry. By J. C. Chamberlain, Ph.D. London: George Routledge and Sons, Ltd. Pp. 960. 16s.

The author states in his preface that he has "endeavoured to present the subject in a sufficiently elementary manner so as not to be beyond the student in his first course in organic chemistry." We should scarcely subscribe to this statement. The chief difficulty with the beginner is to understand how pure substances are prepared and identified as pure, and then how their molecular formulæ are ascertained; but here he is confronted at once with the formulæ for methane and its homologues, and he only finds out when he reaches the last chapter on p. 913 how this is done. On the other hand, as an advanced text-book we can cordially recommend it. It is clearly written and well arranged and "covers the entire field by taking up all the important groups of compounds." It is a little overloaded with facts and perhaps underloaded with theory. In regard to the physical properties, which are of some importance in their relation to structure, the author is content to refer the student to the physics text-book, a proceeding which generally results in the matter being overlooked or neglected.

In the description of stereo isomerism there occurs the sentence, "an arrangement unsymmetrical on one side would explain a dextro form and the arrangement unsymmetrical on the other would explain the levo form, etc." Precisely what is meant by this is difficult to understand. Another doubtful statement is found on p. 256 referring to the tautomerism of aceto acetic ester, "the two formulas do not represent *different* compounds but the *same* compound." This may be the case in some examples of tautomerism, but it is certainly not so here, where both substances have been isolated and are distinct individuals, the only difference from ordinary cases of isomerism being their easy interconversion.

It is surprising that the author, an American, who gives a list of the American recipients of the Perkin medal, omits any mention of Twitchell's hydrolytic process or Frasch's method for desulphurising petroleum. There is a very useful bibliography of organic books of reference and a good index.

J. B. C.

Within the Atom. By John Mills. London: George Routledge and Sons, Ltd. Pp. 215. 6s.

An extensive literature is springing into existence setting out the modern ideas and theories as to the structure of the atom, its properties in relation to chemistry, light, electricity and magnetism, and the way these functions of energy and the atom are related to each other. Mr. Mills, an American physicist, has dealt with these topics in an easy manner, his book being intended for those with only the most elementary knowledge of mathematics, electricity or chemistry. The book is pleasantly written and gives to a reader who is not too critical a good picture of the atom and its electrons, the atomic numbers, positive ray analysis, isotopes, the models of atoms as conceived by Bohr, Lewis, Langmuir and others. So far as the intentions of the author permit, an account is given of X-ray spectra, of the various features of ordinary spectra, the Zeeman effect, the Balmer and other series, the Rydberg constant, and Planck's Quantum Theory of Energy.

Although the reader may obtain from this book some general ideas on these topics, he will not obtain so detailed an account of any one of these difficult problems as the student requires. The chemist who wishes to master the elements of these and some other complicated physical theories must at the present time be prepared to read a good deal of rather fatiguing literature; some few portions have been already lucidly explained by Soddy, Aston and others; but the armchair books on Bohr's view of the atom, on the various vibrations which will account for the multitudinous lines in spectra, on the structure of crystals, and so on, have yet to be written. If half a dozen such books were written a valuable contribution to chemistry would be made. Meanwhile we must be content with such a general survey as this; it is both readable and accurate.

S. M.

Some Physico-Chemical Themes. By Alfred W. Stewart, D.Sc. London: Longmans, Green and Co. Pp. 419. 21s.

Dr. Stewart has added another volume to the well-known books, mainly on physical chemistry, which he has written, and no higher praise is necessary than to say that "Some Physico-Chemical Themes" maintains the high standard of excellence of his other works. Dr. Stewart claims that the book is suitable for third-year or post-graduate students, and bridges the gap between the text-book and original literature. It is not claimed that the treatment of the many subjects dealt with is exhaustive—most would indeed require a separate volume—but sufficiently full treatment is given to enable any reader with a sound foundation of chemical knowledge to grasp the essentials.

Amongst the many themes dealt with are residual affinity, the formation of double salts, pseudo-acids and indicators, non-aqueous ionising media, colloids, adsorption, chemical affinity and emission spectra. Later we have valuable sections on the development of the Periodic System, its uses and limitations, the atoms and the Periodic System, and views on atomic structure. Finally there is a useful bibliography on unorthodox lines, as it does not consist of a mere collection of titles, but concisely indicates to the reader to what special literature he may best turn for further reading in any particular subject dealt with in the text. In addition references to original papers are given throughout the chapters.

J. S. S. B.

Dyes Classified by Intermediates. By R. Norris Shreve. New York: The Chemical Catalog Co., Inc. Pp. 625. $10.

This work, in one volume, is arranged alphabetically under the names of the intermediate products. The exact chemical name, trade name, empyrical and structural formula, and molecular weight are given. Great care has been taken to avoid confusion between products with several isomers by the use of numbers indicating the position of a radicle to the nucleus, as well as the terms ortho, para, alpha, beta, etc. A short note as to the general method of manufacture is given, together with references to works giving further information.

The main idea of the book, however, is the tabular presentation under each intermediate of the dyestuffs in whose manufacture it is used, together with statistics showing imports and home manufacture in the U.S.A., the names of other intermediates required for, and the method of application of, each particular dyestuff. Each dyestuff has attached to its name for easy identification its number in Schultz's *Farbstofftabellen*, 1914. Statistics as to imports and manufacture are also given for the intermediate products themselves. The information given is as full as could be expected within the limits of one volume, and to those interested in the manufacture and use of intermediate products for dyestuffs it should be very useful for quick and easy reference given in a novel way.

It is rather a pity that in a book published in 1922 the author should decide to use in the "Glossary of Dye Names," given at the end, only those names in existence

before the war. In the writer's opinion this will make the book out of date considerably sooner than necessary. The inclusion of Schultz numbers, however, certainly avoids all possibility of confusion. For a completely up-to-date book, those interested in this extensive and important branch of science must look to the publication by the Society of Dyers and Colourists of *The Colour Index*, edited by Dr. F. M. Rowe.

Mr. Shreve's book is, however, a valuable addition to the scanty library in existence on dyestuff manufacture, by reason of its presentation from an entirely new angle.

B. H.

CALCULATIONS OF ANALYTICAL CHEMISTRY. By EDMUND H. MILLER, Ph.D., Professor of Analytical Chemistry in Columbia University. Third Edition, revised and enlarged. London: Macmillan and Co., Ltd. 1921. Pp. 201. 9s.

Although Dr. Miller's preface to the third edition of his book is dated as long ago as September, 1904, the title page is dated 1921. But the contents of the book are certainly not out of date and are quite suitable for use as a guide to the modern student. The book is intended to be used in schools and colleges in connection with tuition in analytical work. Considerably more than 200 questions involving chemical calculations are given together with the answers to the questions.

There are ten chapters. Commencing with an explanation of the methods of calculating chemical equivalent weights and atomic weights, the author passes to calculations of formulæ from percentage compositions and of percentage compositions from formulæ. Then he deals in turn with calculations from equations, the calculation and use of factors, calculations in volumetric analysis and calculations of the densities and calorific values of solids, liquids and gases.

The final chapter is devoted to electric and electrolytic calculations. In view of the fact that electricity is now extensively employed in analytical work as well as in industrial operations, this chapter is especially noteworthy, for the subject is often not discussed in books on chemical calculations. Many chemists and students of chemistry have only a very limited acquaintance with the calculations and methods of measurement used in electrical work and will find this chapter useful.

The American origin of the book is indicated by the questions concerning relative money values being expressed in cents per pound, in the use of the word meter for metre and of liter for litre. At the end of the book a number of useful tables are given. These include a table showing the relationship between units of electricity, heat and power, and a table of electro-chemical equivalents.

H. F. H.

THE ANALYSIS OF NON-FERROUS ALLOYS. By F. Ibbotson and L. Aitchison. London: Longmans, Green & Co. Pp. 242. 12s. 6d.

This is a second edition of a book published just before the great war commenced. It deals with a branch of analysis which had not previously received the separate and connected treatment which the importance of the subject required. At one time it was considered sufficient to determine copper, tin, and zinc in alloys, and other elements were taken by difference. The importance of small traces of impurity, or of small quantities of definitely added elements, gradually came to be recognised; while the introduction of nickel and aluminium alloys opened new fields of investigation. Lead, arsenic, manganese, iron, cadmium, and chromium, either as impurities or as added elements are examples of other analyses now regularly required; all of these are dealt with in the book under review. The new edition contains a new chapter devoted to the analysis of light aluminium alloys, and methods for the analysis of complex nickel alloys are also included. Dr. Ibbotson is well known for his book on the analysis of steel, and the present volume is a valuable addition to the literature of metallurgical analysis. The first edition has already taken its place in Universities and schools, and the second edition will be welcomed not only in teaching institutions but in many industrial laboratories. The book is well and plainly printed, and the appendix includes a table of logarithms.

T. T.

DICTIONNAIRE ANGLAIS-FRANÇAIS-ALLEMAND DE MOTS ET LOCUTIONS INTÉRESSANT LA PHYSIQUE ET LA CHIMIE. By R. CORNUBERT. Paris: Dunod, Editeur. Pp. 297. 42 fr.

Scientific language and literature grows apace from day to day, and however good a knowledge of foreign languages a chemist may possess, he is rare indeed who can lay his tongue to the foreign equivalent of every scientific term. This comprehensive dictionary of chemical terms in French, English, and German should be invaluable to all engaged in research and industrial chemistry. It is, of course, primarily written for French chemists, and the alphabetical arrangement therefore is necessarily French, but nevertheless it should be extremely useful to English and German students as well.

Retirement of Borough Polytechnic Principal

MANY chemists will learn with regret of the retirement from the Borough Polytechnic Institute of Mr. C. T. Millis, M.I.Mech.E., which takes place in September. Mr. Millis has been the principal of the Institute for many years, during which time he has brought within reach of a large number of students a means of education which is calculated to be of considerable use to them in industrial pursuits. The Borough Polytechnic Institute has long been a good stepping stone for elementary or secondary students to attain a working knowledge of chemistry. Under the departmental headship of Dr. C. Dorée, assisted by a very able staff, a foundation in chemistry is available for any young student whose career is essentially in the commercial world. Three laboratories have been provided for practical work of all kinds. Besides the special equipment required for electro-chemistry, the analysis of laundry materials, foodstuffs and essential oils, the laboratories are well equipped for general work in inorganic and organic chemistry, including the analysis of alloys, minerals, fuel and gases, oils, sugars, starch, cellulose, etc. The following apparatus is available: gas analysis apparatus (Bone), spectroscope, polarimeters, tintometer, and microscopes, Mahler bomb calorimeter, Thomson calorimeter, refractometer, viscosimeter (Redwood) flashpoint apparatus, etc. Students attending the classes in organic chemistry are instructed in the use of the filter press, essence press, autoclave, vacuum still, tar and petroleum still, centrifugal separator, grinding mill, pyrometer, etc. The department possesses a good reference library, including most of the modern dictionaries and text-books of pure and applied chemistry. Auxiliary subjects such as physics and mathematics are also encouraged. With regard to the actual courses of inorganic chemistry, the students pass from the elementary stage, to the study of the atomic theory and the periodic law, the halogen group of elements, the theory of bleaching, sulphur, phosphorus, its manufacture, uses and chief compounds; boron, carbon, silicon and their compounds; the isolation and properties of the common metals. The principles of the processes involved in the manufacture of bleaching powder, sulphuric, nitric, and hydrochloric acids are also demonstrated. In the organic chemistry course consideration is given to sugars, alkaloids, coal-tar colouring matters, the terpenes, certain of the unsaturated acids, etc. Laboratory work is arranged to comprise quantitative estimation of carbon, hydrogen, nitrogen, sulphur, and the halogens. It also includes the chief methods of organic manipulation, condensation, Grignard's reaction, and the preparation and identification of many organic compounds.

Oil and Colour Chemists

Proposed Standard Specifications for Resins

THE last paper of the 1921–22 session of the Oil and Colour Chemists' Association was a review of the question of purchasing specifications for resins and shellac, by Mr. W. B. Parker, F.I.C., of the British Thomson-Houston Co., Rugby. The author pointed out that, with the exception of shellac and resin, no serious attempt has been made to crystallise the existing knowledge of these important raw materials into standards which could be made the basis for their purchase. In the case of resins, this would appear to be due partly to the requisite knowledge being confined to a progressive minority of scientific workers who had given special attention to the chemistry and analysis of resinous materials. Probably it was due mainly to the policy of secrecy which, until comparatively recently, had been followed by both suppliers and users, whilst another contributory influence had been the neglect of these highly intricate natural materials by research students and professors at teaching institutions. He could not remember a single contribution to the chemistry of resinous materials emanating from British universities or technological colleges during the last 25 years.

The advent of the so-called synthetic resinous or lac products had put a new aspect on the subject, and must ultimately force those who made it their business to cultivate, collect and vend the natural resinous products to put their business upon a much more scientific and systematic basis, and to recognise that unless they kept pace with modern demands for exactitude in raw materials their businesses must perish. Suppliers, and more especially "middle-men," such as merchants and brokers, always evinced a reluctance to introduce standards for purchase, and in general showed an impatient attitude to any move which appeared likely to rob them of the "personal" factor in their dealings, and to prevent "pickings" being made from the less informed customers. Such personal considerations should not, and could not, permanently stand in the way of the progress of the oil, paint and varnish trades, and it was imperative that the resin and lac trade should be standardised so far as the inherent qualities of the products permitted. Whilst admitting that there were difficulties to be overcome before the specifications became generally acceptable, the author believed that these could be overcome by determined and concerted action.

Suggested Basis for Specifications

The author explained how such a system could be evolved without unduly disturbing present trade practices, and made suggestions for actual specifications for some of the resinous and lac products. The first consideration when building up specifications for new materials was the choice of the analytical items, or factors, physical properties, and outstanding characteristics. After setting these out in detail, he came to the conclusion that for present practical purposes only the following factors were suitable for specification purposes :—

(A) *Chemical.*—Moisture, per cent.; mineral matters (ash), per cent.; total non-resinous matters, per cent.; iodine value, per cent. (Hübl—24 hours' test); acid value (direct and back titration); saponification value (hot); rational composition, per cent. (partial or complete).

(B) *Physical.*—Gross solubility per cent. in specific solvents.

(C) *Physical characteristics.*—Colour; size; cleanliness; habit (when of positive value).

It was not suggested that all these must be stipulated in every case, but that at present they represent the most useful and satisfactory materials for use in drafting specifications.

The next question was that of making the specifications (as far as possible) suitable for the largest number of purposes or the largest individual demands. This was a subject for a committee, which should be very carefully selected so that all interests were ably represented by practical exponents. There was need for all the following sections of the resinous materials trade to be represented, at least in the final stages of the discussion :—

1. Proprietors and cultivators of original sources (preferably through their Governments or botany and forestry specialists.
2. Manufacturers and exporters of the marketed products.
3. Merchants and importers of the products (exchanges and associations).
4. Oil and spirit varnish manufacturers (which includes manufacturers of the so-called lacquers and japans).
5. Enamel and paint manufacturers.
6. Electrical engineering industry (as users and producers of insulating varnishes, etc.).
7. Government departments (as users).
8. Other users, such as manufacturers of sealing wax, furniture polishes, linoleum, printing ink, agglutinants, etc.

It was urged that the specifications, in every possible case, should aim to procure and govern the sale of the pure and genuine materials, leaving the actual users to do the mixing or adulteration (if required).

The author then considered some actual values for a few of the most utilised resinous materials, and put those values into draft specifications, with the object of showing how they could be utilised in compiling specifications. There was in use a long list of vague descriptive terms for grades of shellac, but the main distinctions which really existed were purity, colour and condition, and the author would substitute six grades for the whole trade, viz. :—(*a*) Lemon (yellow), pure; (*b*) pale orange, pure; (*c*) orange, pure; (*d*) deep orange (T.N. standard 3 per cent. rosin wax); (*e*) brown (U.S.A. and inferior, 3 per cent. to 10 per cent. rosin); and (*f*) dark brown (resinous), 10 per cent. to 15 per cent. rosin.

In drafting the specifications, the author had depended almost entirely upon the test data and experience obtained in the chemical department of the British Thomson-Houston Co. He was of opinion that the Oil and Colour Chemists' Association could do an extremely useful piece of work if it formed a committee of about a dozen workers who would undertake to procure large authentic samples of bulk consignments of up-to-date resins, and, in collaboration, determine all their characteristics and constants, and publish the results as "standards." Prior to doing this, standard methods of test would have to be set up, which would not be a difficult matter. He would gladly co-operate in the work.

Chemists' Claim for T.N.T. Process

Improved Manufacturing Methods

SITTING in London on Monday, Mr. Justice Sargent presiding, the Royal Commission on Awards to Inventors heard further evidence respecting the claim of Lieut.-Col. Craig, Sir R. Robertson, Dr. R. C. Farmer, and Dr. G. Rotter regarding the invention of a process for the manufacture of tri-nitro toluene. The previous hearing was reported in THE CHEMICAL AGE last week. Mr. J. Hunter Gray, K.C., and Mr. R. Harker appeared for the claimants, and the Attorney-General, Mr. Whitehead, and Mr. Trevor Watson opposed the claim on behalf of the Treasury.

Dr. R. Crosbie Farmer, formerly Chief Assistant Chemist at the Research Department, Woolwich, and Chemical Adviser to the Explosives Supply Department during the war, said that T.N.T. was manufactured before 1914, but the existing processes were of no assistance in arriving at the methods adopted by the claimants. The earlier processes involved the use of oleum, which they were required to do without. The process they evolved produced a good yield, with economy of time and safety in handling. He denied that the remedies with which they had overcome defects in the process were obvious routine methods. Their difficulties were increased by the need for working at extremely high pressure day and night.

Dr. Godfrey Rotter, now Director of Explosives Research at Woolwich, corroborated the evidence of Dr. Farmer. Questioned by the Attorney-General regarding the gradations and increases in his salary since 1914, the witness replied that he could not remember what was his salary in 1920. His salary never interested him particularly.

Mr. William Macnab, Technical Adviser to the Explosives Department of the Ministry of Munitions in 1915, and an original member of Lord Moulton's Committee, said the claimants' process was thoroughly well thought out and developed, with accurate and definite directions given for all stages. It resulted in a great saving of time and increase in production compared with earlier processes, and was a great advance on them. The plant designed and set up in the factory at Oldbury, near Birmingham, in 1915, by Mr. K. Quinan and himself was designed to use a minimum of oleum in the manufacture of T.N.T. It was equally applicable for a process not using oleum at all.

The hearing of the claim had not been concluded when the Commission adjourned.

June Trade Returns

Further Improvement in Chemical Exports

ALTHOUGH the Board of Trade Returns for June show a falling off in values totals for imports, exports and re-exports as compared with May, this state of affairs is, fortunately, not reflected in the statistics relating to chemicals, drugs, dyes and colours. Last month we were able to record an increase of £130,000 in exports under this heading, and the exports for the month under review indicate a further increase of £36,010. Imports of chemicals were also £36,101 more in value than those for the preceding month.

Imports of Chemicals

A comparison between quantities imported in June and May of this year respectively, shows quite considerable decreases under sodium compounds, glycerine (crude and distilled), and potassium compounds other than nitrate; potassium nitrate, however, shows a moderate increase, while the imports of acetic acid and tartaric acid were practically doubled. There was a slight check in the influx of cream of tartar, the month's total being 954 cwt. less than in May. The detailed import figures, in cwts., unless otherwise stated, are given below with the May figures in parentheses. INCREASES: Acetic acid (including acetic anhydride, 567 tons (278); tartaric acid (including tartrates not elsewhere specified), 5,432 (2,936); bleaching materials, 4,171 (967); calcium carbide, 17,263 (15,440); red lead and orange lead, 3,155 (2,035); potassium nitrate, 13,095 (9,407); and zinc oxide, 500 tons (358). DECREASES: Borax, 3,005 (3,240); crude glycerine, 3,406 (6,472); distilled glycerine, 86 (662); potassium compounds other than nitrate, 157,689 (268,213); sodium nitrate, 20,740 (62,140); sodium compounds other than nitrate, 10,745 (14,664); and cream of tartar, 3,447 (4,401).

Exports of Sulphate of Ammonia

One of the principal export increases is to be seen under sulphate of ammonia, the quantity of which was nearly two and a half times more than the figure recorded for May. Spain and the Canaries were the largest individual importers of this product, their quota being 3,941 tons. They were followed by the Dutch East Indies, with 2,531; the British West Indies, with 808; Italy, with 736, and France, with 21. Other countries not specified in the returns took 3,526 tons. Coal tar products, with the exception of tar oil and creosote, which showed a further increase of over 500,000 gal., were all lower this month, as were also tartaric acid, ammonia chloride, potassium compounds other than chromate and bichromate, and sodium compounds. Zinc oxide and bleaching powder made a good recovery.

The following figures show in detail the products, the May exports of which were larger (as to quantity) than in the preceding month; the May figures are given in parentheses, and the amounts are in cwts., unless otherwise stated: Sulphuric acid, 1,531 (1,193); sulphate of ammonia, 11,563 tons (4,725); bleaching powder, 25,581 (15,639); tar oil, creosote, etc., 3,896,646 gal. (3,324,352); crude glycerine, 1,546 (214); distilled glycerine, 2,949 (1,631); potassium chromate and bichromate, 2,500 (2,197); and zinc oxide, 509 tons (273).

The decreases, similarly compared, are: Tartaric acid (including tartrates not elsewhere specified), 195 (244); ammonia chloride (muriate), 347 tons (475); anthracene, nil (48); benzol and toluol, 4,544 gal. (6,787); carbolic acid, 10,917 (12,897); naphtha, 6,011 (8,652); naphthalene, 1,480 (2,675); coal tar products, other sorts, 15,476 (25,659); sulphate of copper, 4,682 tons (6,571); potassium nitrate, British prepared, 851 (1,937); potassium compounds other than nitrate and chromate and bichromate, 1,815 (2,488); sodium carbonate (including soda crystals, soda ash, and bicarbonate), 368,948 (374,189); sodium caustic, 136,307 (144,183); sodium chromate and bichromate, 4,107 (4,609); sodium sulphate, (including saltcake), 142,420 (148,593); and sodium compounds, other sorts, 50,920 (59,976).

Dyes and Dyestuffs

After the solitary cwt. of coal tar intermediates imported in May there was again no import recorded under this heading, which also includes aniline oil and salt and phenylglycine. The import during June last year was also nil, but in June, 1920, the imports amounted to 4,742 cwt. There were again no imports of synthetic indigo, the total for the six months ended June 30 being nil against 7,063 cwt. in June, 1921, and 333 cwt. in the corresponding month of the previous year. Natural indigo shows a considerable falling off, but the May figure was, under the prevailing conditions, rather unusually large. Alizarine dyes show a further substantial increase, but finished dyestuffs other than alizarine and synthetic indigo show a marked decline. The total quantity of finished coal tar dyestuffs imported during the month under review was 2,131 cwt., as compared with 3,159 in June, 1921, and 13,557 in June, 1920. The comparative figures for June and May this year are: Coal tar intermediates (including aniline oil and phenyl glycine), nil (1); alizarine, 175 (107); finished coal tar dyestuffs other than alizarine and synthetic indigo, 1,956 (3,422); cutch, 2,099 (2,716); extracts for dyeing, all other sorts, 10,980 (7,411); natural indigo, 45 (214); and extracts for tanning, solid or liquid, 44,613 (63,461).

Exports of dyes and dyestuffs were greater as to quantity and value. The total of 7,761 cwt. (as against 7,358 in May), made up of 4,000 cwt. of coal tar products and 3,761 cwt. of other sorts, was valued at £69,005, while the previous month's exports amounted in value to £55,375, which again, was a distinct advance on the April total of £32,117.

Imports of painters' colours and materials showed a further decrease under most headings, barytes being a further 10,000 cwt. less. There was, however, an increase of 15,699 under painters' colours and materials, other sorts, which brought the bulk total over 2,000 cwt. above the previous month's figure. Exports all showed increases with the exception of paints and enamels, prepared, and painters' colours and materials, other sorts.

The comparative figures are: IMPORTS: Ground barytes (including blanc fixe), 44,566 (54,665); white lead (basic carbonate), 9,845 (13,112); other sorts, 59,991 (44,292). EXPORTS: Ground barytes (including blanc fixe), 7,573 (4,958); white lead, 18,724 (18,150); paints and colours ground in oil or water, 20,389 (19,086); paints and enamels, prepared (including ready mixed), 14,878 (17,938); other sorts, 43,041 (45,095).

Scientific Instruments and Glassware

Scientific glassware (except tubing and rod) was imported to the value of £5,350, as compared with £6,412 in May, while 700 cwt. of glass tubing and rod, valued at £2,446, were imported, as against 764 cwt. of the value of £2,644, imported in the preceding month. Exports of tubing and rod totalled 200 cwt., worth £1,519, against 101 cwt., of the value of £929, shipped in May. We imported 105,121 gross of glass bottles and jars, as against 119,759 gross, and exported 28,651 gross, as compared with 29,986 gross.

Scientific instruments and appliances (except electrical) were imported to the value of £35,471, against £40,680, while the exports under this heading totalled £66,006 as compared with £74,592.

Coal exports were 263,582 tons less at 4,793,648 tons, and were worth £5,391,946, as compared with £5,790,288.

British Cotton-Seed Products

PRESIDING at the second ordinary general meeting of British Cotton-Seed Products, Ltd., held on Tuesday at Winchester House, London, Lord Doneraile said the actual working of their plant at Chatham had satisfied the directors that the defibrating machine would work continuously with little attention when supplied with suitable seed. The sales of defibrated seed indicated that they might rely upon finding a steady market for that product at a good premium on the price of the original seed. They naturally expected a certain number of difficulties in practical working at the start, but these had been readily surmounted. The degree of variation in the quantity and condition of the lint in different parcels of seed having the same origin had been found to be unexpectedly great in some of the varieties they had treated, and had rendered the introduction of some preliminary cleaning plant advisable. The additional machinery, however, was not a very large matter, and would now become part of the ordinary installation, the second instalment of which was now in hand.

British Association of Chemists

Unemployment Benefit Scheme Approved

As briefly announced in THE CHEMICAL AGE last week, a special general meeting of the British Association of Chemists was held on Saturday, July 8, at the Midland Hotel, Manchester, for confirmation of the advisory ballot on the Unemployment Benefit Scheme and for its formal adoption as part of the rules of the Association. In the unavoidable absence of the President, the chair was taken by Mr. Wm. E. Kay, there being about 50 members present.

The CHAIRMAN said that an attempt was now being made to help, out of a common purse, those among them upon whom there were serious and urgent calls. Although they had taken the best professional advice they could, the Unemployment Benefit Fund Scheme was somewhat tentative in the sense that there was still very little known as to how unemployment among chemists stood in relation to general unemployment. There were no actuarial figures available which would give them the means of putting forward a cut-and-dried scheme. Therefore they had had to prepare one which had in it elements of elasticity, and they had endeavoured to prepare, under certain aspects of the scheme, means of meeting special contingencies. In a preliminary way the feeling of the members had been tested, and had proved to be emphatically in favour of the establishment of a scheme. Only 14 per cent. objected to it. The course that he intended to pursue in the conduct of the meeting was to put before them two resolutions :—

(1) " That this meeting confirms the result of the ballot on the Unemployment Benefit Fund Scheme, and hereby authorises the Council to proceed with its registration as an addition to the rules of the Association."

(2) " That the rules for the Unemployment Benefit Fund be put into immediate operation, and that subscriptions to the Fund be payable as from July 1, 1922."

The Chairman then formally moved the first resolution.

Mr. HARRISON, as secretary of the Fund Committee, seconded. He thought that this was the greatest economic scheme which had ever been placed before chemists. It would benefit the Association in many ways, financially and socially, and he was convinced that in the future the fortunes of the Association would largely depend upon it.

Dr. FOSTER inquired whether the scheme could be made applicable for probationers to join it voluntarily. It was stated that, under the rules in their present form, this could not be done, but if thought necessary some provision could be made in that direction.

Mr. R. BRIGHTMAN suggested that before dealing with the question of probationers they should obtain fresh actuarial advice.

Dr. FOSTER said that his question was merely intended to be suggestive, and the Chairman promised that the Committee would consider the point.

Consideration of Rules

Rules 2 and 3 provide that the Fund shall be administered through a Special Purposes Committee appointed by the Council, and shall include the Trustees of the Association, and that the benefits paid shall be upon a " unit system " and shall vary in accordance with the number of units of contributions taken up.

Rule 7 was considered in the following form :—(7) The maximum number of units for which a member may subscribe shall be dependent on age and in accordance with the following schedule, except in the case of a married member, who may take up one extra unit :—

Age at joining.	Benefit per week for each Unit subscribed.	Maximum number of Units for which a member may subscribe.
21–30	20/–	3
31–40	20/–	4
41–46	17/6	5
47–60	15/–	6

Rule 8 was also considered in the following form : (8) Members ceasing to be employed in so far as their main employment is concerned, but who may be earning fees or other remuneration in respect to teaching or other part-time employment, either day-time or evening, shall receive benefits in accordance with the following scale :—

Earnings from part-time employment as above.	Rate of benefit payable.
Not exceeding 30s. per week ..	Full benefit.
Exceeding 30s. per week, but not exceeding 50s. per week ..	Three-fourths.
Exceeding 50s. per week, but not exceeding 75s. per week ..	One-half.
Exceeding 75s. per week, but not exceeding 105s. per week ..	One-fourth.
Exceeding 105s. per week.. ..	Nil.

Rule 10 provides that no benefits shall be payable during the first month of unemployment, and Rule 11 that in order to provide a nucleus for the Fund no benefits shall be payable during the first six months of the operation of the scheme. Members joining the Fund after the date of the scheme first being put into operation will also not be eligible for benefit until six months from the date of their first subscription. Rule 13 makes provision for any member being suspended from benefit owing to his own misconduct.

The whole of the rules having been discussed, and necessary textual alterations having been made, they were confirmed in the terms of the first resolution.

The CHAIRMAN then moved, and Mr. Redgrove seconded, the adoption of the second resolution, which was carried unanimously.

A general discussion then took place, in the course of which Mr. A. S. Mills gave an account of the working of the Unemployment Bureau and of the rebates which were now allowed by the Income Tax Commissioners in respect to damaged clothing, etc. Closer co-operation with the National Union of Scientific Workers was also advocated.

Sicilian Sulphur Industry

THE Sicilian sulphur industry is now said to be passing through a very acute crisis. It experienced during the war a period of exceptional prosperity, which continued until after the conclusion of the peace. According to the *Times* Milan correspondent, the depression began to make itself felt early in 1921, when, in consequence of low freight rates and the trend of the exchange, American sulphur gradually won its way into all the European markets, including France and Spain, which are normally among the largest purchasers of the Sicilian product. An immediate effect of the loss of several foreign markets was a decrease in the sales made by the Italian Corporation, which combines all the Italian producers. It is estimated that during the period August 1, 1921, to July 21, 1922, the sulphur received and sold by the corporation will amount to only 70,000 tons, while during the corresponding period 1920-1921, the total was 139,575, and in the period 1919-1920 205,790 tons. In order to meet the American competition, the Italian Corporation has lowered prices considerably, but this move has been neutralised by a corresponding reduction on the part of the American firms, who are, in addition, competing among themselves. The situation is understood to be serious, for in 1905 the Italian sulphur industry produced over 500,000 tons, and only a few years ago held almost a world monopoly. The origin of the crisis is the high cost of production. Whereas in 1914 a ton of sulphur at the port of embarkation cost lire 74.83, in 1921 the cost had mounted to lire 467.33.

Dr. R. F. Ruttan

DR. RUTTAN, the retiring President of the Society of Chemical Industry, is now back in London after the annual meeting in Glasgow, and will remain at the Chemical Industry Club for some time. He has met and exchanged opinions with many officials of Government departments and with representatives of chemical companies, and he hopes to be able to visit some of the Sections of the Society of Chemical Industry—certainly Manchester and Liverpool—before he leaves for Canada on August 11. On his return to London from Glasgow, we understand, Dr. Ruttan addressed to the Lord Provost of the city, and to all responsible for the successful organisation of the meetings and excursions, a warm letter of thanks for their hospitality and assistance. Next week we hope to publish an interesting statement of Dr. Ruttan's impressions of his visit.

Alkali Works Inspection in 1921

Chief Inspector's Annual Report

THE Fifty-Eighth Annual Report on Alkali, etc., Works [H.M. Stationery Office, 1s.] has already been referred to in THE CHEMICAL AGE. The following abstracts are taken from the Report :—

Average escapes of muriatic acid gas in alkali and copper (wet process) works were satisfactory and percentage concentration was good. There has been comparatively small demand for sulphuric acid, and consequently operations have been on a considerably reduced scale. The use of spent oxide in this manufacture has been more noticeable this year. Extension of the burning of spent oxide in mechanical furnaces has emphasised the need for the adoption of the best possible means of dust deposition. A slowing down of the speed of the gases by passing them through a large unpacked chamber is one of the most efficient methods of dust removal.

Ammonia Oxidation

The " ammonia oxidation " method of providing oxides of nitrogen for sulphuric acid chambers has still further established itself ; not only are firms who have already adopted it extending its use, but the method is being taken up by others in various parts of the country. Using a gas mixture containing 10 per cent. of ammonia, and maintaining a satisfactory gauze temperature, excellent results are obtainable ; the advantage gained by pre-heating the ammonia-air mixture by some form of heat interchanger is a point which should not be overlooked.

With regard to sulphuric acid (Class II. : Contact and Concentration) works, the report states that it is desirable that greater attention should be paid to the packing in the scrubbers attached to concentration plants. More care should be exercised in the actual construction of scrubbers, the character and grading of coke, and periodical inspection should be made with a view to maintaining efficiency.

Sulphate and Muriate of Ammonia

These manufactures have been carried on under very adverse conditions, to which the results of the coal strike and the high price of sulphuric acid have been contributors. Had it been possible to set off the value of the sulphur in spent oxide against the cost of acid the position would not have been so bad, but increasing stocks of the former only served to increase the difficulties of the situation. A tendency to increased recovery of muriate of ammonia at coke-oven works is recorded.

Operations generally at bisulphide of carbon works have been well conducted, and the sulphuretted hydrogen escaping from the process of manufacture has been satisfactorily dealt with.

Chemicals and Disinfectants for Cuba

To the Editor of THE CHEMICAL AGE.

SIR,—I beg to inform you that His Majesty's Chargé d'Affaires, British Legation, Havana, Cuba (Mr. Donald Campbell) reports that from time to time inquiries are received in the Legation for the names and addresses of United Kingdom producers of a cheap grade of liquid coal-tar disinfectant largely used in Cuba and other Latin-American countries.

As it would appear that a demand exists for this product, Mr. Campbell considers it would be useful to receive quotations for large quantities and trade matter in duplicate, with a view to placing them before half a dozen of the largest importers. Mr. Campbell would thus be in a position to ascertain whether United Kingdom firms are able to compete and at the same time interest firms in the possibility of buying their supplies of this article in the United Kingdom.

In addition, it is suggested that it might be useful for firms interested to communicate with the principal wholesale importers of chemicals in Cuba. A list of such firms can be obtained on application to this Department.—Yours, etc.,

E. H. BLISS,
For Comptroller-General.

Department of Overseas Trade,
35, Old Queen Street, London, S.W.1.

Government Contracts

THE following were among the Government Contracts let during the month of May :—

ADMIRALTY (CONTRACT AND PURCHASE DEPARTMENT).—*Chemicals :* F. Allen and Sons (Poplar), Ltd. ; Brunner, Mond and Co., Ltd. ; Burgoyne, Burbidges and Co., Ltd. ; Joseph Crosfield and Sons, Ltd. ; United Alkali Co., Ltd. *Glycerine :* C. Thomas and Brothers, Ltd. *Lead, Red :* Alexander Fergusson and Co., Ltd. ; Foster, Blackett and Wilson, Ltd. ; Locke, Blackett and Co., Ltd. ; Walker Brothers and Co., Ltd. *Paint, White Lead :* Brimsdown Lead Co., Ltd. ; Cox Brothers and Co., Ltd. ; Foster, Blackett and Wilson, Ltd. ; Walkers, Parker and Co., Ltd. *Paint and Colours :* Blacklock and Macarthur, Ltd. ; Burrell and Co., Ltd. ; Colthurst and Holding ; Docker Brothers, Ltd. ; N. J. Fenner and H. B. Alder and Co., Ltd. ; Golden Valley Ochre and Oxide Co., Ltd. ; Goodlass, Wall and Co., Ltd. ; John Hare and Co. ; Naylor Brothers (London), Ltd. ; Andrew G. Soutter and Co., Ltd. ; Wm. R. Todd and Son, Ltd.

CROWN AGENTS FOR THE COLONIES.—*Fertilisers :* Anglo-Continental Works, Ltd. *Quinine :* Howards and Sons, Ltd. *Sulphate of Potash :* F. W. Berk and Co., Ltd. *Sulphate of Ammonia :* British Sulphate of Ammonia Federation, Ltd.

Recent Wills

Mr. James Rolls Hoare, 48 Mount Street, London, varnish and colour manufacturer	£157,786
Mr. William Salvadore Curphey, of Canfield Gardens, London, late Chief Inspector of Alkali Works	£2,486
Mr. James Wallbank, Granville Road, Blackburn, director of Openshaw, Ltd., wholesale chemists	£2,367
Mr. James Spilsbury, F.I.C., The Nook, Wake Green Road, Moseley, Birmingham, analytical chemist	£27,309
Mr. Henry Parker, Crosby Road, Forest Gate, Essex, of Messrs. Denton and Jutsum, varnish manufacturers	£7,020
Mr. Alfred Edwin Sadler, of Sand Hall, Ulverstone, Lancashire, joint managing director of Sadler and Co., Ltd., chemical manufacturers, Middlesbrough	£7,963
Dr. Andrew McWilliam, of Upperthorpe, Sheffield, lately Metallurgical Inspector to the Government of India, and formerly Professor of Metallurgy in the University of Sheffield	£9,450

Municipal Gas Accounts

WELL known in the gas industry as presenting useful comparative data and therefore affording guidance to individual undertakings, *The Gas World* "Analyses of Municipal Gas Accounts, 1920-21 " (Benn Brothers, Ltd., 21s. net.), supplies in a very handy form a mass of statistical information relating to no fewer than 69 gas undertakings. Comparative figures are given of the tar and ammoniacal liquor made, the receipts for residual products, manufacturing charges, etc., of all the undertakings, and these statistics are also averaged. By an ingeniously arranged card, comparison with the figures of any of the undertakings given is facilitated. Distribution and management charges and a number of other items are similarly dealt with.

Anti-Corrosion Problems

ONE of the results of Sir Robert Hadfield's recent estimate that the ravages of rust and corrosion represent an annual wastage of £500,000,000 is a suggestion to hold an international exhibition of non-corrodible and anti-corrosive products in London at an early date. It is also proposed to form an association of manufacturers of non-corrodible and anti-corrosive products, which, in addition to fulfilling the requirements of an Institution of Anti-Corrosion Engineers, would serve also as a Chamber of Commerce to firms interested. Mr. W. R. Douglas Shaw, Royal Society of Arts, 18, John Street, Adelphi, London, will supply particulars.

Safeguarding of Industries Act

Sodium Thiosulphate Inquiry

THE inquiry into a complaint that Sodium Hyposulphite R and Sodium Thiosulphate R have been wrongly included in the list of articles chargeable with duty under Part I of the Safeguarding of Industries Act, was opened on July 7 by Mr. Cyril Atkinson, K.C., and continued on July 8. In addition to that published in THE CHEMICAL AGE last week, the following evidence was given.

Mr. JOHN BROWN (Brown and Forth, Ltd., chemical merchants, of London, Manchester, and Brussels) said he had not arrived at any decision as to whether hypo was a fine or a heavy chemical. To him chemicals were chemicals. He had never heard it referred to as a fine chemical, and agreed with Sir Arthur Colefax that he had never heard it referred to as a heavy chemical. He did not recognise any difference between the pea and the large crystals chemically, and attributed the difference in price to packing principally.

Mr. O. F. C. BROMFIELD (Secretary of the British Chemical Trade Association) said he always classified hyposulphite of soda amongst industrial chemicals.

Commercial and Pea Crystals

Mr. E. PARRY (consulting chemist) said the processes of manufacture described in the counter statement of the Board of Trade were accurate, but they might have added that sodium hyposulphite was also made to some extent from the sulphur residues in dye works. Most of those manufacturing hypo were typical heavy chemical manufacturers. The real difference between the commercial and pea crystals was in form, and chemically the two were so nearly identical that it would not be an exaggeration to say they were identical. The only differences in the processes of production of the two forms depended upon crystallisation. It was not correct to say that photography necessitated a better quality hypo than that used for ordinary industrial purposes.

In the course of further evidence on Saturday, July 8, Mr. PARRY said that the addition of the letter R in the list did not convey a definite meaning to him as a chemist and the method adopted of distinguishing between the crude and the pure was arbitrary.

Referee's Suggested Amendment

Mr. WHITEHEAD, for the Board of Trade, said it was not the practice of the Board of Trade to regard all pea crystals as dutiable. Only those that were recognised as of photographic quality were dutiable.

The REFEREE asked how anyone was to know whether they were of photographic quality or not if no specification was laid down and nothing more definite said than was in the list. A Customs officer was not a photographic expert and it must definitely be said what was to be taxed.

Mr. WHITEHEAD said there was a perfectly well recognised photographic quality which was known in the trade. Before the Act came into existence they had the pea quality which was, in fact, the same thing as photographic and would still be if properly and genuinely prepared. At the present time, however, the pea quality was being contaminated in order to evade the Act and so the complainants were trying to get hypo out of the list altogether. The pea crystal now took a different form from what it did before the passing of the Act, but the Board of Trade only wanted the duty on the photographic form. The Board of Trade had drawn the conclusion hitherto that the large crystals were the crude and the small crystals the R and dutiable form.

The REFEREE said he therefore took it that the Board of Trade would have to show that the difference in the cost and in the skill required to produce the finer quality ought fairly to transfer what was a heavy chemical into the fine class.

Mr. WHITEHEAD said the point was whether photographic hypo was a fine chemical or not.

In the course of re-examination, Mr. Parry agreed that since the Act he believed there had been a deliberate degradation of hypo in order to escape the duty, but there were no recognised standards for photographic purposes.

This closed the case for the complainants.

Evidence for Opponents

Sir ARTHUR COLEFAX then opened the case for the opposition, and called Mr. E. B. COOK, managing director of Johnson and Sons, Manufacturing Chemists, Ltd., the only witness called for the opponents. All the hypo which his firm sold was of photographic quality, about 99 per cent. He should reject it if it were below, but the purity went up to any thing between 99 and 100 per cent. The hypo his firm sold was bought and tested, and although it was not sold to the public on a guarantee of purity, yet it had to comply with certain tests before it was put on the market.

The REFEREE suggested that it might be convenient to say that if it were 99 per cent. purity it came within the Act.

The witness said he had never heard of a commercial quality of 98.5 per cent. purity. All the hypo which his firm sold was in the form of pea or cube, which was made by the United Alkali Co., on the representation of his firm, after it had been introduced in this form from Germany.

The REFEREE asked Mr. Swan to give his views as to why hypo, in its purest form, when used as an analytical reagent, should not come within the schedule.

Mr. SWAN said that in the first place it had been given in evidence that the photographic hypo was in ordinary use as an analytical reagent and also only an infinitesimal quantity was used for this purpose. The case for the other side was that the words " analytical reagents " meant all analytical reagents, including fine chemicals and refined heavy chemicals. Was it fair to suppose that the Legislature contemplated a tax of 33⅓ per cent. upon, say, bicarbonate of soda merely because an infinitesimal proportion was used for analytical purposes? There were many heavy chemicals used in this way, and according to the opposition, they would all have to be taxed.

Mr. WHITEHEAD, for the Board of Trade, said the view of the Board was that every analytical reagent was a fine chemical. It was recognised that there were people who used as analytical reagents materials which were not of that purity which was ordinarily adopted for analytical work. If they had a substance which was not a fine chemical, but was used as an analytical reagent, the Board still said it came within the schedule because the phrases in the schedule " analytical reagents " and " all other fine chemicals " could be separated.

The REFEREE said his feeling was that if a substance were an analytical reagent it was within the schedule, either because that made it a fine chemical within the meaning of the Act, or, if they separated the two phrases, because it was an analytical reagent. As to the entry in the list, the difficulty might be got over by adding the words, " photographic standard or quality " or " analytical reagent quality."

Mr. SWAN said he was willing to have a percentage basis.

Sir ARTHUR COLEFAX would not agree to this because of the difficulty of deliberate adulteration.

Mr. WHITEHEAD said that if the Referee was going to make any change either by eliminating R or adding words of definition, he would ask him to hear further evidence and the Board would get the Customs officers to deal with it.

The REFEREE asked Mr. Swan whether he would like him to state a case on that part of the schedule.

Mr. SWAN said one should be quite content with the Referee's decision, but as to the words of definition, his view was that " photographic " was not the right term; the qualification should be in terms of analytical uses.

The REFEREE said he thought the evidence showed that there was a more or less recognised photographic quality which was 99 per cent., but something which was the merest fraction under might come in which would be just as good either for photographic or analytical purposes.

The inquiry was then adjourned.

Syrian Soap Industry

IN his report on trade conditions in Syria in 1921-22 [H.M. Stationery Office, 9d.] Mr. H. E. Satow states that about 4,000 tons of soap were produced in 1921. The quality, he says, is not uniform, as the oil used is of varying purity. The present output is about half of the pre-war production, the decrease being chiefly due to the closing of the markets in the interior.

Chemical Matters in Parliament

Anglo-Persian Oil Bill

The Anglo-Persian Oil Company (Payment of Calls) Bill was read the third time and passed. (House of Commons, July 17).

Safeguarding Act Revenue

Answering Mr. Kiley (House of Commons, July 17), Sir Robert Horne said the total amount of duty collected under the Safeguarding of Industries Act up to July 15 was not yet available.

British Dyestuffs Corporation

Replying to Major Barnes (House of Commons, July 10), Mr. Baldwin said his attention had been drawn to the financial position of the British Dyestuffs Corporation, Ltd., but no proposals had been made to the Government in respect of its holding in the company.

Employment in Key Industries

Sir W. Mitchell-Thomson informed Capt. Wedgwood Benn (House of Commons, July 18) that the Board of Trade had no official information relating to employment in the industries affected by the Safeguarding of Industries Act other than that contained in the reports of the Committees.

Duty on Palm Oil

In reply to Dr. Murray (House of Commons, July 17) Mr. Churchill said the duty on palm oil exported from Sierra Leone was recently reduced to £1 os. 10d. per ton, which was a little more than 4 per cent. of the price at Freetown at the end of May. In the present financial condition of the colony he was unwilling to sanction the abandonment of any tax which yielded an appreciable revenue.

Government Investments

Sir W. Mitchell-Thomson informed Mr. Wise (House of Commons, July 11) that the President of the Board of Trade did not receive periodical reports of companies such as the British Dyestuffs Corporation, Ltd., and the British Cellulose and Chemical Manufacturing Co., Ltd., and other companies where the Government has representative directors and has invested the taxpayers' money.

Anglo-Persian Oil Co.

Mr. Malone was informed by Mr. Bridgeman (House of Commons, July 10) that as H.M. Government had undertaken not to interfere in the commercial management of the Anglo-Persian Oil Co., no special instructions to the Government directors would be given in regard to it. He had no reason to believe that the company would be unwilling to consider any proposals that might be made to them by British collieries in regard to refining oils obtained from coal.

Safeguarding Act Procedure

Mr. Baldwin informed Captain Wedgwood Benn (House of Commons, July 17), that it was his intention at an early date, when the reports of the committees now sitting had been received, to review the position with a view to seeing what alterations, if any, could usefully be made in the procedure under the Safeguarding of Industries Act. The possibility of the suspension of the Act had not occurred to him, and he would not admit that the present procedure was unsatisfactory.

Refund of Duties

Mr. Foot (House of Commons, July 10), asked the President of the Board of Trade whether he had taken the opinion of the Law Officers of the Crown on the question of a refund of duties paid on articles subsequently ordered by the Lord Chancellor's referee to be removed from the lists, seeing that Section 5 of Part I of the Act did not appear to preclude the refund of these duties, but merely said without prejudice to the validity of anything previously done thereunder.

Mr. Baldwin said the answer was in the negative. He might add that notice had been given by two Members of an Amendment to the Finance Bill which would give the House opportunity to decide this particular matter.

Synthetic Perfumes

Sir T. Bramsdon (House of Commons, July 17) asked the President of the Board of Trade whether he was aware that quantities of toilet soaps were being imported into England containing synthetic perfume and dye materials, upon which no duties were collected, but that when it was desired to import the substances separately for the use of British manufacturers they were either prohibited or duty was demanded on them; and whether he would consider the desirability in such cases of admitting these substances free of all duty.

Mr. Baldwin said he was aware of the facts referred to. Legislation would be required to give effect to the proposal made in the last part of the question, and he did not see his way to introduce a measure for that purpose.

Dumping Complaints

Mr. Baldwin, in reply to Mr. Hogge (House of Commons, July 10) said that something short of 120 trades or branches of trades had communicated with the Board of Trade since the coming into force of Part II of the Act in August, 1921, but the majority of these had not progressed beyond the stage of inquiry with a view to formulating complaints. Of those which had so progressed, 45 related to goods manufactured in Germany, and of these 13 were referred to Committees; in 29 cases complainants failed to establish a *prima facie* case, or withdrew the complaints or have been asked to furnish further information; and three were at present under consideration.

Mr. Baldwin, in reply to Mr. Kenyon (House of Commons, July 17), said he had received no complaints under Part II. of the Safeguarding of Industries Act since October 1 last.

Draft Orders

Mr. Kiley (House of Commons, July 10), asked the Prime Minister whether he was aware of the profound dissatisfaction caused to traders whose interests were affected by the draft Orders under the Safeguarding of Industries Act and that it was alleged that the decisions of the Committee had been arrived at against the weight of evidence submitted; and whether he was prepared to receive deputations from the traders concerned, provided that they brought definite information in justification of their contention.

The Prime Minister said he was satisfied that the Committee had given the most careful and impartial consideration to all the evidence submitted to them within the scope of their terms of reference. He was not prepared to take the course suggested in the last part of the question.

Safeguarding Act Questions

Mr. Hannon (House of Commons, July 11) asked the President of the Board of Trade how many questions had been asked during the present Session on the subject of the various provisions of the Safeguarding of Industries Act: what proportion of these questions sought for information which could have been obtained from documents already published by the Board of Trade; what number of officials and how much time was it estimated was involved in the preparation of these answers; and what was the estimated cost to the taxpayer of each answer given.

Sir W. Mitchell-Thomson said that approximately 300 questions on this subject had been addressed to the Board of Trade, and, in addition, a substantial number on the same subject had been addressed to the Treasury. The proportion referred to in the second part was probably relatively small. As regards the third and fourth parts, no reliable estimates could be given.

Sodium Pyrophosphate

Dr. Murray (House of Commons, July 10), asked the President of the Board of Trade whether, in view of the Referee's decision on points of principle in the cream of tartar and other cases which had come before him, he would consider removing sodium pyrophosphate from the lists defining the key industries schedule.

Mr. Baldwin referred Dr. Murray to his answer on the same subject on May 15. [The substance of this reply was that sodium pyrophosphate had not been the subject of any formal complaint within the terms of Section 1 (5) of the Safeguarding of Industries Act, and was accordingly outside the scope of his review]. Mr. Baldwin added that no complaint had been made during the period which was open for complaints with regard to it.

After a supplementary question by Mr. Kiley, Mr. Hannon asked whether Mr. Baldwin would consider the advisability of attaching a chemical laboratory to the House of Commons for the use of Members above the Gangway. Major M. Wood objected that Mr. Hannon's question had been put by way of an obstruction, but Mr. Speaker said he thought it was meant merely as a kindly bit of humour.

From Week to Week

MR. J. A. D. MACKEY has been elected Master of the Tallow-chandlers' Company.

SIR ROBERT HADFIELD has been elected president of the Engineers' Club, Coventry Street, London, as from the beginning of September.

The first monthly part of the COLOUR INDEX, which is being prepared by the Society of Dyers and Colourists, will be ready at the end of the month.

The annual dinner of the BRITISH CHEMICAL PLANT MANUFACTURERS' ASSOCIATION was held on Wednesday at the Holborn Restaurant, London, Mr. L. M. G. Fraser presiding.

According to a message from Washington, the United States Senate has rejected THE DYE EMBARGO, permanently excluding it from the Tariff Bill by a vote of 36 to 32.

MR. WILLIAM ALEXANDER KENNEDY, lately a cinchona planter to the Government of Bengal, died at 2, Beechwood Avenue, Finchley, London, on Monday, in his 67th year.

G. F. BERRY AND CO., chemical merchants, of 3, London Wall Buildings, London Wall, announce the removal of their offices to Broad Street House, New Broad Street, London.

An assistant lecturer and demonstrator in chemistry will be required in September at the DERBY TECHNICAL COLLEGE. Forms of application may be obtained from the Principal of the College.

MR. A. F. CAMPBELL, F.I.C., of Hardman and Holden, Ltd., chemical manufacturers, Manchester, has been admitted to the degree of Doctor of Science in Chemistry of the Manchester University.

Katanol is the name of a NEW MORDANTING MATERIAL reported to have been developed by the German firm of Friedr. Bayer and Co., to replace tartar emetic in applying basic dyes to cotton fibres.

GRIMSLEY AND CO., LTD., chemical engineers, St. George's Works, Queen Street, Leicester, inform us that they have recently placed on the market a new machine for the automatic grading or selection of pills.

DR. E. F. ARMSTRONG, the new President of the Society of Chemical Industry, has arranged to spend a few weeks in Switzerland. He will make his headquarters in the Oberland, where he hopes to do a little climbing.

MR. FRANK WILLIAM HARBORD has been appointed as the representative of the Institute of Chemistry on the Sectional Committee on Cement of the British Engineering Standards Association in the place of the late Mr. Bertram Blount.

The death occurred on July 16, at 230, Kenmure Street, Pollokshields, of Mr. JOHN GUTHRIE WIGHT, lately with Alexander Hope, jun., and Co., Ltd., chemical manufacturers, Provanmill, Glasgow. The interment took place on Tuesday at the Glasgow Necropolis.

H.M. Agent and Consul-General at Tangier has forwarded a report on the work of the SHEERIFIEN OFFICE OF PHOSPHATES during the year 1921, which may be consulted by United Kingdom firms on application to the Department of Overseas Trade, 35, Old Queen Street, London.

According to advices received by the Anglo-South American Bank from its branch in Valparaiso, the recent comparative firmness in the Chilean exchange has been partly due to the CONTINUED DEMAND FOR NITRATE OF SODA. The tonnage sold during the week ended July 7 for delivery within the present month amounted to 10,448 tons, and a further 29,464 tons has been sold for delivery in August.

MR. WILLIAM MARSHALL, F.I.C., has been appointed Chairman of the Manchester Section of the Society of Dyers and Colourists, of which he is an original member. He has been connected with the bleaching, dyeing and finishing trades for a period of 45 years, and is also Chairman of the local section of the Institute of Chemistry, and the representative on the London Council of the Institute for Manchester and District.

A deposit of RADIUM ORE is reported to have been discovered in the Ferghana Valley, Turkestan, Central Asia, and is being worked by the Soviet Mining Council. A highly radio-active mineral has also been found in the Belgian Congo, and at a recent meeting of the French Academy of Sciences it was stated that the new mineral would be called "Soddite," in honour of Professor F. Soddy, the English radium expert. The ore is said to be very rich in uranium.

The gas research fellowship, value £200, established by the Institution of Gas Engineers for the prosecution of post-graduate RESEARCH IN GAS CHEMISTRY, at Leeds University, has been awarded to Mr. Stuart Pexton, M.Sc., Leeds. The Corbett Woodall scholarship, tenable at Leeds University for three or four years and endowed in 1915 by the late Sir Corbett Woodall through the Institution of Gas Engineers, has been awarded to Mr. W. H. B. Hall, who is at present engaged in the physical laboratories of the South Metropolitan Gas Co.

Among interesting developments recorded in the annual report of the CHIEF INSPECTOR OF FACTORIES is the manufacture of a new type of stainless steel, and the introduction of synthetic "silver-nickel." In the section dealing with the establishment of new works, reference is made to a large match factory at Garston, a factory for refining edible oils in the agricultural district of the Isle of Axholme, factories in the Bradford district for the manufacture of formic acid and hydrogen peroxide, and lanoline from grease extracted from the wool in wool-combing works, and a new cement factory at Hull.

By the opening of the new dock at Stanlow Point, on the lower section of the Manchester Ship Canal, an important addition has been made to the facilities at the disposal of the oil industry. Manchester now occupies the second place among home ports for quantity of oil imported, and the huge installation of storage tanks which has been built in close proximity to the docks has a total capacity exceeding thirty-five million gallons. Until now the IMPORTATION OF PETROLEUM spirit or other oils giving off an inflammable vapour at a lower temperature than 73° Fahr. has been prohibited at Manchester.

DR. BERNARD DYER, Agricultural Analyst to the Essex County Council, reported at their last meeting that the unsatisfactory samples analysed during the past quarter were one of sulphate of potash, one of wool waste, and four of potato manure. The sulphate of potash guaranteed to contain 52 per cent. of potash contained only 47·70 per cent., a shortage of 4·30. The wool waste was 1·70 per cent. low in nitrogen. In two cases of the potato manure the vendor stated the total of phosphates only, without differentiating the soluble from the insoluble, and in the fourth case there was a shortage in the insoluble phosphate.

In an industrial survey of the first half of 1922, the Board of Trade *Journal* states that there has been A CONSIDERABLE IMPROVEMENT in most branches of the heavy chemical trades, partly as a consequence of increasing activity in the textile and other industries, and partly owing to an expansion of export demand. The resumption of work in the engineering trades is bringing with it an increased demand for home consumption of various chemicals. A noteworthy feature of the export trade latterly has been the large shipments of tar oil, creosote, etc. In general, prices are said to be firm, with a tendency to rise. Some branches of the fine chemical trades are reported to be making good progress.

The Pharmacy Bill, which has been introduced in the House of Commons is designed to regularise the position of all persons trading as chemists and druggists or pharmacy store proprietors in the sale of drugs, the dispensing of doctors' prescriptions, and the sale of patent medicines. It consists of 16 clauses, the first of which restricts the USE OF THE TITLE "CHEMIST" to those possessing qualifications defined by the Act. Power to authorise the use of the title "chemist" is vested in the Institute of Chemistry, who will conduct examinations and grant certificates. Further restrictions are placed on the sale of poisons, and the Bill provides that it shall not be lawful for a manufacturing or wholesale chemist to supply poisons except to a registered pharmacist.

THE DECREPITATION by heat of barytes from various sources together with its technical application in the separation of barytes from other minerals was described in a paper by Dr. T. M. Lowry and Mr. L. P. McHatton, read before the Faraday Society recently. The authors stated that the decrepitation of barytes may be attributed, as in the case of water-soluble salts such as lead nitrate, to the presence of included water; clear fragments have been obtained which are completely resistant to decrepitation by heat and a semi-quantitative relationship has been found between the water-content of barytes and the fineness of the powder produced by decrepitation. Quantitative experiments were also described on the relationship between the loss of weight and the fineness of the powder produced by the decrepitation of celestine, crocoite and common salt.

References to Current Literature

British

RUBBER.—The microscope in the rubber industry. W. M. Ames. *Rubber Age*, July, 1922, pp. 213–218.

Recent developments in the chemistry of rubber. Part I. W. C. Geer. *Rubber Age*, July, 1922, pp. 222–225.

OPTICALLY ACTIVE COMPOUNDS.—The general behaviour of optically active compounds. T. S. Patterson. *Science Progress*, July, 1922, pp. 60–74.

SYSTEMS.—The system potassium sulphate—aluminium sulphate—water at 25°. H. T. S. Britton. *Chem. Soc. Trans.*, June, 1922, pp. 982–986.

HYDROAROMATIC COMPOUNDS.—Studies in the dihydronaphthalene series. Part III. The oxidation and bromination of 5 : 8-dihydro-α-naphthylamine. F. M. Rowe and J. S. H. Davies. *Chem. Soc. Trans.*, June, 1922, pp. 1000–1007.

ACIDS.—The aldehydosalicylic acids and their derivatives. E. J. Wayne and J. B. Cohen. *Chem. Soc. Trans.*, June, 1922, pp. 1022–1029.

The behaviour of the stannic acids towards hydrochloric acid. G. E. Collins and J. K. Wood. *Chem. Soc. Trans.*, June, 1922, pp. 1122–1133.

POLYSACCHARIDES.—The constitution of polysaccharides. Part IV. Inulin. J. C. Irvine, E. S. Steele and M. I. Shannon. *Chem. Soc. Trans.*, June, 1922, pp. 1060–1078.

PHOTO-CHEMISTRY.—Photocatalysis. Part II. The photosynthesis of nitrogen compounds from nitrates and carbon dioxide. E. C. C. Baly, I. M. Heilbron and D. P. Hudson. *Chem. Soc. Trans.*, June, 1922, pp. 1078–1088.

PHYSICAL CHEMISTRY.—The influence of solvents on the velocity of formation of quarternary ammonium salts. J. A. Hawkins. *Chem. Soc. Trans.*, June, 1922, pp. 1170–1176.

The rate of evolution of carbon dioxide from solution in presence of colloids. A. Findlay and O. R. Howell. *Chem. Soc. Trans.*, June, 1922, pp. 1046–1052.

KETONES.—The reactivity of doubly conjugated unsaturated ketones. Part III. Unsymmetrical hydroxy- and methoxy-derivatives. J. S. Buck and I. M. Heilbron. *Chem. Soc. Trans.*, June, 1922, pp. 1095–1101.

HALOGEN COMPOUNDS.—The conversion of allyl alcohol to glyceryl chloro- and bromo-hydrins. J. Read and E. Hurst. *Chem. Soc. Trans.*, June, 1922, pp. 989–999.

FOODSTUFFS.—The testing of foodstuffs for vitamines. J. C. Drummond and A. F. Watson. *Analyst*, June, 1922, pp. 235–246.

WAXES.—The constants of Indian beeswax. O. D. Roberts and H. T. Islip. *Analyst*, June, 1922, pp. 246–251.

United States

UREA.—Synthesis of urea from ammonia and carbon dioxide. N. W. Krase and V. L. Gaddy. *J. Ind. Eng. Chem.*, July, 1922, pp. 611–616.

WOOD.—Wood as a chemical engineering material. C. S. Robinson. *J. Ind. Eng. Chem.*, July, 1922, pp. 607–610.

Studies in wood decay. Part III. H. Schmitz. *J. Ind. Eng. Chem.*, July, 1922, pp. 617–618.

OILS.—Drying oils from petroleum and other products, produced by chlorination and dechlorination. H. A. Gardner and E. Bielouss. *J. Ind. Eng. Chem.*, July, 1922, pp. 619–621.

The surface tension of petroleum. C. K. Francis and H. T. Bennett. *J. Ind. Eng. Chem.*, July, 1922, pp. 626–628.

FUEL.—Detonation characteristics of blends of aromatic and paraffin hydrocarbons. T. Midgley and T. A. Boyd. *J. Ind. Eng. Chem.*, July, 1922, pp. 589–593.

Benzene as a motor fuel. J. J. Lawton. *J. Ind. Eng. Chem.*, July, 1922, p. 635.

CORROSION.—Prevention of corrosion of metals by water in a closed system. P. West. *J. Ind. Eng. Chem.*, July, 1922, pp. 601–607.

CATALYSIS.—First report of the committee on contact catalysis. W. D. Bancroft. *J. Ind. Eng. Chem.*; Part III., June, 1922, pp. 545–548; Part IV., July, 1922, pp. 642–646.

TANNING.—Studies in chrome tanning. Equilibria between tetrachrome collagen and chrome liquors; the formation of octachrome collagen. A. W. Thomas and M. W. Kelly. *J. Ind. Eng. Chem.*, July, 1922, pp. 621–623.

ACIDS.—Manufacture of phosphoric acid in the electric furnace by the condensation and electric precipitation method. T. Swann. *J. Ind. Eng. Chem.*, July, 1922, pp. 630–631.

Cascade system of sulphuric acid concentration. L. A. Thiele. *Chem. Age (N. York)*, June, 1922, pp. 279–280.

PLATINUM.—Recovery of platinum from used contact mass at the Old Hickory powder plant. A. L. Kibler. *J. Ind. Eng. Chem.*, July, 1922, pp. 636–641.

TAR.—Markets for low-temperature coal tars. R. P. Soule. *Chem. Age (N. York)*, June, 1922, pp. 251–253.

French

COAL.—Modern processes for the treatment of lignite and its derivatives. Part II. C. Berthelot. *Chim. et Ind.*, June, 1922, pp. 1079–1089.

SOLUTIONS.—Equilibria in the double decomposition between soluble salts and some of their applications. Part II. E. Rengade. *Chim. et Ind.*, June, 1922, pp. 1090–1098.

UREA.—Industrial conversion of ammonia into urea, a fertiliser of high concentration. C. Matignon and M. Fréjacques. *Chim. et Ind.*, June, 1922, pp. 1057–1070.

VANILLIN.—Vanillin. J. Martinet and P. Alexandre. *Chim. et Ind.*, June, 1922, pp. 1043–1056.

FUEL.—National fuel and the distillation industry. Mariller. *Chim. et Ind.*, June, 1922, pp. 1071–1077.

BENZYL COMPOUNDS.—Some dialkylbenzyl nitriles and the corresponding alcohols, amides, amines and acids. J. Blondeau. *Compt. rend.*, May 29, 1922, pp. 1424–1426.

REACTIONS.—The action of acetylene on the sodium derivatives of ketones and the preparation of dialkylethinylcarbinols. R. Locquin and S. Wouseng. *Compt. rend.*, May 29, 1922, pp. 1427–1429.

German

RARE EARTHS.—The rare earth metals in the periodic system. C. Renz. *Z. anorg. u. allg. Chem.*, June 20, 1922, pp. 135–145.

The separation of rare earth metals by basic precipitation. Part III. Quantitative separation of cerium from other rare earth metals. W. Prandtl and J. Lösch. *Z. anorg. u. allg. Chem.*, June 20, 1922, pp. 159–166.

CHLORINE.—The decomposition of chlorine into atoms. M. Trautz and W. Stäckel. *Z. anorg. u. allg. Chem.*, June 20, 1922, pp. 81–131.

PHOTO-CHEMISTRY.—Radiation as a factor in thermal and photo-chemical reactions. N. R. Dhar. *Z. anorg. u. allg. Chem.*, June 20, 1922, pp. 151–158.

ANALYSIS.—Quantitative estimation of sulphides by oxidation with ferric sulphate. P. P. Budnikoff and K. E. Krause. *Z. anorg. u. allg. Chem.*, June 20, 1922, pp. 171–174.

Mineral analysis by X-ray-spectroscopic methods. A Hadding. *Z. anorg. u. allg. Chem.*, June 20, 1922, pp. 195–200.

Iodometric estimation of copper in the presence of iron. A. Wöber. *Z. angew. Chem.*, June 27, 1922, pp. 336–337.

POLYSACCHARIDES.—Problems in the chemistry of polysaccharides. H. Pringsheim. *Z. Angew. Chem.*, July 4, 1922, pp. 345–349.

CARBON.—Carbon and its neighbours in the periodic system. A. Stock. *Z. angew. Chem.*, June 30, 1922, pp. 341–343.

VARNISHES.—Investigation of different varnishes and paints with reference to their rust-preventing properties. Maas and Junk. *Z. angew. Chem.*; Part I., July 7, 1922, p. 353; Part II., July 11, 1922, pp. 360–363.

GENERAL.—The preparation of arsenic-free chemicals. G. Lockemann. *Z. angew. Chem.*, July 11, 1922, pp. 357–361.

PHOSPHATES.—The manufacture of double superphosphates and the preparation of sodium phosphate. Part I. H. Voss. *Chem.-Zeit.*, June 29, 1922, pp. 581–583.

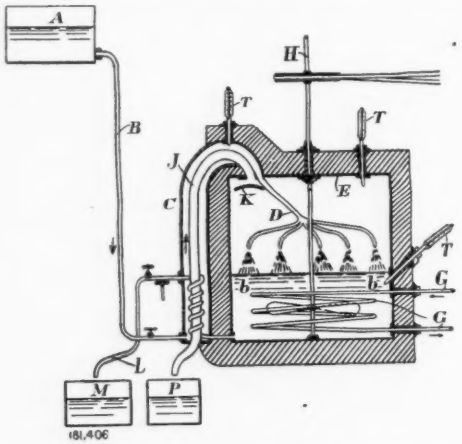
OILS.—The working up of the more important kinds of petroleum. R. Kissling. *Chem.-Zeit.*; Part I., June 17, 1922, pp. 541–544; Part II., June 22, 1922, pp. 562–565.

Patent Literature

Abstracts of Complete Specifications

181,406. Evaporating Liquids, Process for. L. H. A. Bohrmann, 247, Kaiserstrasse, Karlsruhe, Baden, Germany. Application date, December 10, 1920.

This apparatus effects the rapid evaporation of large quantities of liquid in a comparatively small evaporating chamber, and is particularly suitable for concentrating solutions which are difficult to deal with by ordinary methods, such as caustic soda or sulphuric acid. The liquid to be evaporated is sprayed into contact with a large quantity of a hot liquid which is maintained at a temperature above the boiling point of the volatile liquid. The heated liquid must be one which is miscible with the liquid to be evaporated.

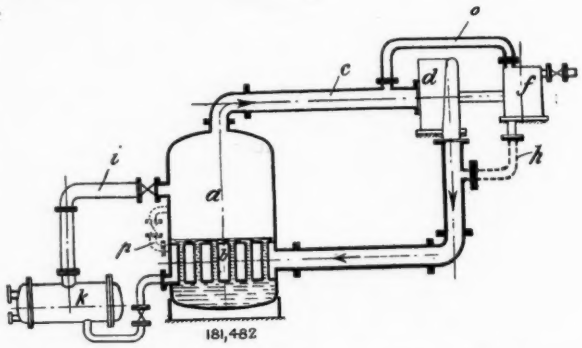


181,406

When applied to the concentration of caustic soda, the dilute soda passes from a tank A through pipe B to a wide pipe C, and thence to a distributing device D which sprays it on to the surface of a concentrated solution of caustic soda *b*, having a boiling point of 150°–200° C. This solution is heated by superheated steam passed through a coil G, and is stirred by a rotary device H. Thermometers T are provided at the inlet and outlet so that the rate of flow may be regulated. The steam liberated passes behind the baffle K through the pipe J and preheats the dilute inflowing solution. The condensed steam collects in the vessel P, and the concentrated soda solution passes through the pipe L to assist in preheating the dilute solution, and thence to the vessel M. The apparatus may also be used for concentrating sulphuric acid, using concentrated sulphuric acid in the vessel E. No difficulty is experienced in spraying the dilute acid into the strong acid, owing to the fine state of division of the former. A diminished pressure is maintained in the evaporator. In evaporating salt solutions to crystallising point, the liquid *b* may be a high-boiling oil in which the salt separates.

181,482. Operating Evaporation Plants Heated by Compressed Vapour, Method of. Metallbank und Metallurgische Gesellschaft Akt.-Ges., 45, Bockenheimer Anlage, Frankfurt-on-Main, Germany, and W. Gensecke, 87, Homburgerstrasse, Bad Homburg, vor der Höhe, Germany. Application date, March 14, 1921.

The plant is of the kind in which steam is used as the heating agent, and is obtained by compressing the vapour produced in the evaporation. A steam driven turbo-blower is usually employed, and the object is to obtain the maximum economy from the plant. The vapour generated in the evaporator *a* passes through a pipe *c* to a compressor *d* driven by an engine *f*, and is then delivered through the heater *b*. The exhaust steam from the turbine is not conducted through a pipe *h* to the delivery pipe of the compressor as usual, but through a pipe *o* to the suction pipe of the compressor. The condensate from the heater *b* passes to a vessel *k*, and uncondensed vapour passes through a pipe *p* to the evaporator *a*. Vapour may also pass through a pipe *i* to the vessel *k*. The compressor *d* and turbine *f* are mounted in a single casing to avoid the use of stuffing boxes when the plant is operated under vacuum.



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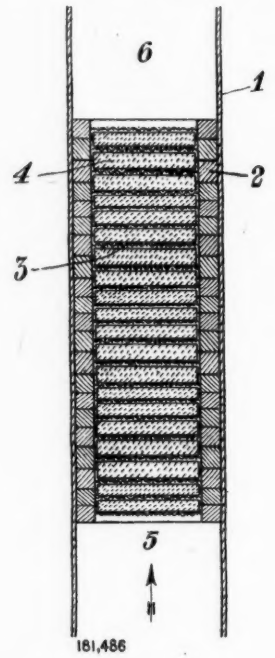
181,486. Catalytic Oxidation of Ammonia with Oxygen, Method of. I. W. Cederberg, Lidingö-Brevik, Sweden, and H. M. Bäckström, Djursholm, Sweden. Application date, March 15, 1921.

When ammonia is oxidised catalytically by means of oxygen instead of air, very high temperatures are obtained, and there is also a danger of explosion when using ammonia-oxygen mixtures having a high percentage of ammonia. In the present invention, combustion of an ammonia-oxygen mixture containing 35–40 per cent. of ammonia may be obtained without risk of explosion, by using a platinum catalyst deposited on a carrier in a gradually increasing proportion along the zone of combustion. A reaction tube 1 of nickel or aluminium contains a series of metal rings 2, each carrying a disc of wire mesh 3 of inactive material such as nickel. Porous discs 4 of pumice are supported between the discs 3, and finely divided platinum is deposited on these discs in a proportion which increases from the inlet 5 to the outlet 6. In this apparatus the principal reaction is not confined to the first portions of the catalyst with resulting high temperature, but is distributed throughout the reaction tube.



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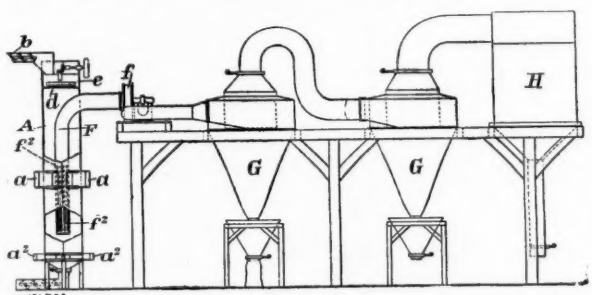
181,509. GLYCERIDES, PROCESS FOR REMOVING FREE ACIDS FROM. W. Gleitz, 35, Heinskamp, Hamburg, Germany. Application date, March 23, 1921.

In the removal of free acids from glycerides by the formation of soaps, it is usually found that the soap carries away substantial quantities of neutral oil. In the present invention, crude oils and fats containing a high percentage of fatty acids are mixed with a substance such as benzene which is a solvent for the glyceride but not for the soap, and the liquid is neutralised with caustic soda or potash, lime, or the like at ordinary temperature. The mixture is then raised to boiling point and cooled, when the soap separates out and may be filtered as a solid mass without carrying oil with it. The solution of neutral oil is separated by distillation. The soap may be treated with a small quantity of fresh lye to hydrolyse any traces of neutral oil. The resulting soap and oil have no odour of the solvent. This treatment may be incorporated in the usual oil extraction process.

181,560. SEPARATION OR GRADING OF POWDERED MATERIALS AND THE TREATMENT THEREOF BY AIR OR OTHER GASES OR VAPOURS, APPARATUS FOR. W. H. Reynolds, 1, Montague Chambers, Dogpole, Shrewsbury, W. W. Dickin, 2, Wyle Cop, Shrewsbury, and G. L. T. Kenyon, 13, Queen's Gardens, London. Application date, April 25, 1921.

The object is to effect a separation or grading of powdered materials to obtain a very fine powder free from grit, such as is required in the case of baryta for the manufacture of paints. The powder is fed by a conveyor *b* on to a sieve *d* having revolving arms *e* arranged above it to assist the passage of the powder into the tower A. A large pipe F projects downwards into the tower and slots f^2 are provided in the pipe about midway of the height of the tower. Suction is applied by an exhauster *f*, so that the lighter particles of the falling powder are withdrawn as they pass the slots f^2. The powder withdrawn is again graded in cyclone separators, G,G, and finally passes to a vessel H. The tower A is provided with regulating valves *a* immediately opposite the upper ends of



the slots f^2, and similar valves a^2 at the bottom of the tower by which air may be admitted. The inflow of air deflects the falling material towards the slots f^2 so that the quality of the powder drawn off may be regulated by manipulating the valves. The heavier powder which falls to the bottom of the tower may be drawn off and reground. The powder may be treated with a gas or vapour by surrounding the lower half of the tower A with an annular chamber, through which the gas or vapour is admitted to the valves *a*, a^2. If a powder is treated the particles of which tend to adhere together, a revolving beater is arranged below the sieve *d*. If the powder contains a considerable proportion of larger particles, a preliminary centrifugal separation may be effected at the top of the tower by the use of a rotating disc or impeller. The heavier material is withdrawn from a conduit at the side without passing through the tower.

181,571. ACETYLENE GAS, MATERIALS FOR PURIFYING. J. R. Booer, 7, Gabriel Street, Honor Oak Park, London, S.E.23, and The District Chemical Co., Ltd., 1, Fenchurch Avenue, London, E.C.3. Application date, May 9, 1921.

The usual purifying agents for acetylene gas, such as ferric chloride and ferric oxide are found to be slow in absorbing phosphoretted hydrogen and sulphuretted hydrogen. It is now found that the action may be accelerated by the addition of a small proportion of cupric chloride which acts as a catalyst. As an example, the purifier may consist of ferric chloride 80 lb., ferric oxide 85 lb., kieselguhr 60 lb., water 35 lb., cupric chloride 8 lb., and mercuric chloride 1 oz. The mercuric chloride acts as a catalytic accelerator. It is found desirable to allow the material to age for 2–12 months to render it more permeable to the gas. This material is also capable of absorbing ammonia and hydrochloric acid from acetylene, and may be regenerated by exposing in a thin layer to air.

181,575. NEW ARTIFICIAL RESIN PRODUCTS, MANUFACTURE OF. H. Dreyfus, 8, Waterloo Place, London, S.W.1. Application date, May 12, 1921.

An aqueous solution of acetaldehyde is added gradually to a mixture of cyclohexanone and caustic soda lye or other condensing agent in a closed vessel. The mixture is heated and then cooled, and the condensing agent is removed with water. Homologues of cyclohexanone such as methyl or dimethyl-cyclohexanones may also be used. The resinous products may be used in the preparation of varnishes or electric insulators. In an example, a mixture of cyclohexanone 100 parts, alcohol 100 parts, and caustic soda 1 part in a 50 per cent. solution, is heated to 80°–90° C. and 250 parts of 25 per cent. acetaldehyde added. The alcohol is then distilled off, and the resulting oil washed and allowed to solidify.

181,584. PIGMENT COLOURS, MANUFACTURE AND PRODUCTION OF. J. Y. Johnson, London. From Badische Anilin & Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, May 20, 1921.

Pigment colours are produced by treating the bisulphite compound of nitroso-beta-naphthol with ferric oxide salts. The transformation into a green pigment may be effected in the presence of turkey red oil or similarly acting substances. The ferric salt may be employed in the proportion of one atom of iron to two molecular proportions of nitroso-beta-naphthol or in smaller quantity. Ferrous salts may also be employed, but in smaller quantities, preferably about two thirds of the quantity above indicated. The preparation of the pigment may be effected in the presence or absence of the substrates usual in the manufacture of colour lakes. The pigments obtained are a brilliant green, very finely divided, and fast to light, water and alkalies.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—158,513 (A. J. H. Haddan—Torfverwertungs-Ges., Dr. Pohl and Von Dewitz) relating to dry distillation of raw peat, see Vol. IV., p. 483; 160,143 (Ampere Ges., F. Rothe, and O. Diefenthaler) relating to manufacture of molybdenum or molybdenum-iron alloys, see Vol. IV., p. 592; 166,887 (K. Niedenzu) relating to artificial nitrogenous fertilisers, see Vol. V., p. 411.

International Specifications not yet Accepted

180,314. SYNTHETIC AMMONIA AND CYANAMIDES. Nitrogen Corporation, 55, Canal Street, Providence, R.I., U.S.A (Assignees of J. C. Clancy, 55, Canal Street, Providence. R.I., U.S.A. International Convention date, May 17, 1921.

A catalyst suitable for the synthesis of ammonia consists of a carbon-nitrogen compound, such as the cyanamide of magnesium or beryllium. Magnesium or beryllium carbonate is treated with ammonia gas at a high temperature to produce the cyanamide. The catalyst preferably contains, in addition, finely divided iron, cobalt, manganese, thorium or uranium, or one of their compounds such as the oxide, hydroxide, carbonate, acetate or oxalate. The constituents of the catalyst are formed into a paste with water, and dried in the form of lumps. With this catalyst, a temperature of 400°–500° C. and a pressure of 15–100 atmospheres is necessary for the synthesis of ammonia. The preparation of a catalyst from magnesium and manganese carbonates is described.

180,326. ALUMINIUM. M. Blasi, 13, Paseo de San Juan, Barcelona, Spain. International Convention date, May 18, 1921.

Alumina is fused, and then one-sixth of its weight of barium oxide containing 10 per cent. of powdered or fine grained

aluminium is added. Cryolite or fluorite may be added to act as a flux, and the mixture is electrolysed to obtain aluminium. The oxidation of the added aluminium raises the temperature to 1,200° C., and the reduction of the alumina by electrolysis then proceeds. Further additions of barium oxide are not necessary, alumina and a small proportion of aluminium only being added, together with the flux if necessary. A yield of 15 kilos of aluminium may be obtained from 30 kilos of alumina in half an hour, using 20,000 amps. at a pressure of 7 volts.

LATEST NOTIFICATIONS.

182,759. Production of vat dyestuffs. National Aniline and Chemical Co. (Inc.). July 2, 1921.

182,803. Process and apparatus for separating ammonia and benzol hydrocarbons from coal distillation gases. Ges. für Kohlentechnik M.B.H. July 7, 1921.

182,820. Cellulose derivative and process of preparing same. Little (Inc.), A. April 10, 1920.

Specifications Accepted, with Date of Application

155,834 and 181,023. Filter presses. H. O. Traun's Forschungslaboratorium Ges. July 5, 1918.

158,569. Evaporating apparatus. Soc. E. Barbet et Fils et Cie. January 27, 1920.

159,464. Raw peat and the like, Process for the dry distillation and coking of. A. J. H. Haddan. (*Torfverwertungs Ges. Dr. Pohl und von Dewitz.*) February 22, 1921.

163,975. Aluminium chloride, Method of manufacturing. Aluminium Co. of America. May 26, 1920.

165,744. Vertical retorts. F. J. Collin Akt.-Ges. zür Verwertung von Brennstoffen und Metallen. July 2, 1920.

182,149. Peat, Treatment of. T. Rigby. January 3, 1921.

182,157. Drying peat and other substances. T. Rigby. February 25, 1921.

182,166. Artificial silk and the like from cellulose derivatives, Manufacture of. H. Dreyfus. March 21, 1921.

182,210. Conveyor. W. H. Lieber. March 30, 1921.

182,247. Still for fractionally distilling petroleum oils. E. C. R. Marks. (*Shell Co.*) April 20, 1921.

182,289. Chrome tannage of leather, Preparation of a tanning agent for. A. Glover and G. Martin. May 26, 1921.

182,302. Removing a liquid from the surface of molten metal, Method of. Thermal Industrial and Chemical (T. I. C.) Research Co., Ltd., and J. S. Morgan. June 7, 1921.

182,331. Urea, Manufacture and production of. J. Y. Johnson. (*Badische Anilin- & Soda-Fabrik.*) July 11, 1921.

182,411. Sodium carbonate, Separation of—from liquors or solutions containing caustic soda. Courtaulds, Ltd., and R. O. Jones. June 11, 1921.

Applications for Patents

Ashcroft, E. A. Treatment of sulphide ores, etc. 19,422. July 14.

Bäckström, H. M., and Cederberg, I. W. Apparatus for catalytic oxidation of ammonia with oxygen. 19,405. July 14.

Weizmann, C., and Blumenfeld, J. Titanium compounds. 19,154. 19,155. 19,156. July 12.

Boehringer and Soehne, Ges., C. F. Preparation of anthranilic acid derivatives. 19,511. July 15. (Germany, July 20, 1921.)

Bollmann, H. Distilling-apparatus. 19,031. July 11.

British Cellulose and Chemical Manufacturing Co., Ltd., Briggs, J. F., and Palmer, C. W. Manufacture or treatment of artificial silk, films, etc. 19,488. July 15.

Chown, J. A. Carbonisation and distillation of carbonaceous material. 18,925. July 10.

Dreyfus, H. Manufacture of compositions with cellulose derivatives. 19,255. 19,256. July 13.

Prain, R. P. F., and Imray, O. Y. Treatment of copper ores. 18,897. July 10.

Winfield, J., and Insulators, Ltd. Process for treatment of tar, pitch, etc. 19,257. July 13.

Little, Inc., A. D. Cellulose derivative, and process of preparing same. 18,934. July 10. (United States, April 10, 1920.)

Murphy, T. Soluble tar, bituminous, etc., compound for roads, etc., and process for producing same. 19,041. July 11.

Patents Court Cases

APPLICATIONS have been made by the British Alizarine Co., Ltd., Westinghouse Road, Trafford Park, Manchester, under Rule 7 of the Patents (Treaty of Peace) Rules, 1920, for the grant of licences in respect of the following patents:—16,505/1907 (Badische Anilin und Soda Fabrik) relating to the manufacture of vat colouring matters of the anthracene series, and 7931/1909 J. Y. Johnson—Badische Anilin und Soda Fabrik), relating to the manufacture of colouring matters of the anthracene series. Any notice of opposition must be given by August 10, 1922.

The Trade Conquest of Europe

New Markets for British Goods

AT a luncheon at the London Rotary Club, held on Wednesday at the Hotel Cecil, Mr. R. S. A. Housden presiding, Sir Ernest Benn, who spoke on "The Trade Conquest of Europe," said he wanted to submit the proposal that Europe to-day presents the biggest and most profitable market ever known to mankind. Nothing could be done, however, until we had eliminated political aid from the problem, and nothing worth having in the way of reconstruction could possibly be achieved until business men took matters into their own hands.

The politician, continued Sir Ernest, lived and thrived on trouble, but the existence of the business man depended on peace and quietness. If we analysed the qualities of the greatest statesmen of Europe to-day we should find that much of their success was due to their skill in settling crises, most of which were of their own creation. In this connection he cited the classic example of the Pekin correspondent of *Punch*, who telegraphed to his paper: "Difficult to exaggerate the gravity of the situation, but am doing my best." What we needed was to be able to differentiate between the European political and business situations. A Supreme Council met and decided how many milliards of something which did not exist should be transferred from one nation to another. The debtor nations were obliged to plead great poverty as a reason for not paying their debts, while the creditor nations had to demonstrate their great need and poverty as a reason for pressing for those debts. The effect of this situation, said Sir Ernest, was to give the world a false impression of the real business situation of Europe as a whole, and fortunately the world was now beginning slowly to realise that political aspirations and aims cannot properly be expressed on a cash basis. Money, currency, credit, were invented by business men for business purposes—*i.e.*, a medium to facilitate the exchange of goods and services. When money ceased to represent real things it lost its vital quality. The obvious effect of the big arguments by politicians over inordinately big sums of money was to render the system of exchange incapable of performing its proper functions.

Need of Individual Effort

The British public, continued Sir Ernest, had no idea of the possibilities of Europe as a market. One reason, he would venture to suggest, was that the business men of the world had largely forgotten what business really was. They had become so accustomed to looking to a Ministry of Something or Other which gave unlimited orders on a cost plus percentage basis that they were becoming incapable of acting for themselves. Europe was not a market for those who proposed to do business on those lines; it required the skill and initiative so prominently displayed by our ancestors.

Austria and Germany were giving a practical demonstration of an exaggerated form of currency reform by adapting their currency to the needs of the moment. It had been said that the depreciated state of the exchange in these countries made it difficult for people in them to buy; but this was not necessarily so. At the moment, Austria was the most active market in Europe, and he knew—to give one example—a Manchester man who could not get his goods into the country fast enough. This was due to the desire of the people to transfer their money, which was continually changing in value, into something which was a real, tangible and lasting value.

Europe to-day consisted of no fewer than 30 Sovereign States, 12 of which were to all intents and purposes quite new. This was a most significant fact from the business point of view, as the people of these new nations were all proud of their recently-found individuality and wanted to scrap their old business connections and to establish new ones. To the merchant adventurers—if there were any left—Europe offered extremely favourable opportunities of trade. We must go out to Europe as the Americans are doing, and secure our share.

In conclusion, Sir Ernest expressed his firm conviction that if we were willing to give up waiting for higher authorities to settle things for us and to go out there as business men seeking business, we would find ample and to spare on the Continent of Europe to-day.

Mr. Arthur Chadwick, in returning thanks to Sir Ernest Benn, said the speaker had given them a most timely and welcome talk. He thought the speech might well be summed up in the words "Wake up, Commercial Britain!"

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to* THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

LONDON, JULY 20, 1922.

THE markets have shown considerable activity during the past week, and the home trade turnover in many directions is not unsatisfactory, having regard to prevailing conditions.

Apart from one or two bright spots, export markets have been quiet.

General Chemicals

ACETONE remains in active demand; the price is higher.

ACID ACETIC.—A lively inquiry is evident. The uptake is satisfactory and higher prices are anticipated.

ACID CITRIC remains a rather weak market, demand having contracted considerably.

ACID FORMIC has been in rather better request; price unchanged.

ACID LACTIC.—A little more interest has been shown in this product, a number of sales being reported at current values.

ACID OXALIC has been a slightly better market; stocks are firmly held.

ACID TARTARIC is in fair demand; stocks are rapidly absorbed, but forward inquiry is limited.

BARIUM CHLORIDE remains particularly scarce; supplies for early delivery have reached a very high level of price.

CREAM OF TARTAR is unchanged.

IRON SULPHATE is without special feature.

LEAD ACETATE is much firmer. There is a comparatively good demand of the hand-to-mouth variety.

LEAD NITRATE is unchanged.

LITHOPONE is in good inquiry; price firm.

POTASSIUM CARBONATE is weak and uninteresting.

POTASSIUM CAUSTIC.—Stocks are still hanging fire, and the tendency remains in buyers' favour.

POTASSIUM PRUSSIATE is very scarce for early delivery, and the spot price is again higher.

SODA ACETATE is in good demand, and available supplies are keenly competed for.

SODA NITRITE.—A little more interest has been shown in this product, the price remaining unchanged.

SODIUM PHOSPHATE.—The demand is still rather slow, but prices do not seem likely to contract.

SODIUM PRUSSIATE is still very scarce, and high premiums are paid for early delivery.

WHITE LEAD is unchanged.

ZINC OXIDE remains scarce and the price tends upward.

BICHROMATES.—The English makers notify a reduction in price as follows: BICHROMATE OF POTASH CRYSTALS, 6¼d. per lb.; BICHROMATE OF SODA CRYSTALS, 5d. per lb.; carriage paid to consumers' works. It is understood that manufacturers have applied the reduction to existing contracts.

Coal Tar Intermediates

Business during the past week has been somewhat better on both home and export account. No very large bulk orders are in the market, but on the other hand a larger number of small purchases have been made.

ALPHA NAPHTHOL is in demand on home and export account, and no very large stocks are available.

ALPHA NAPHTHYLAMINE is quiet, but last week's price is maintained.

ANILINE OIL and SALT have passed steadily into consumption at makers' figures.

BENZIDINE BASE is uninteresting.

BETA NAPHTHOL has been in demand both on home and export account, and the price is steady.

BETA NAPHTHYLAMINE is quiet.

DIMETHYLANILINE is without special feature.

DINITROCHLORBENZOL is firm, with home orders in the market.

DINITROPHENOL has been inquired for on export account, but English quotations are rather above the foreign market.

DIPHENYLAMINE is very firm, with small stocks available.

"H" ACID is steady at last quoted figure.

METATOLUENE DIAMINE is firm, with a fair home trade passing.

NAPHTHIONIC ACID is steady, but no large business is passing.

NITROBENZOL is the turn easier.

PARANITRANILINE has been inquired for on export account, but British prices are for the moment out.

PHTHALIC ACID ANHYDRIDE is steady, with a small home business.

"R" SALT is in demand on home account, and the price is firm.

RESORCIN.—A fair home trade has been done, and there is some export inquiry also.

Coal Tar Products

The market generally is steady without any great activity.

90's BENZOL.—The value is still 1s. 11d. to 2s. per gallon on rails at works.

PURE BENZOL is in rather slow demand, with sellers at 2s. 4d. per gallon.

CREOSOTE.—Some new business has been done for the States at last week's prices, and to-day's quotations are without change at 5d. to 5¼d. per gallon in the North, and 5¾d. to 6¼d. per gallon in the Midlands.

CRESYLIC ACID.—There is a moderate demand, and further business has been done for early shipments. The value remains at 2s. 3d. to 2s. 4d. per gallon f.o.b. for Pale 97/99% quality, and 1s. 11d. to 2s. 1d. per gallon for Dark 95/97%.

SOLVENT NAPHTHA.—The demand is still very slow, and business has been done at under 1s. 8d. per gallon at works.

HEAVY NAPHTHA.—There is no change in the position. The quotation is still 1s. 9d. to 1s. 10d. per gallon.

NAPHTHALENE is still very slow of sale, without change in price, namely, £4 10s. to £5 10s. per ton for crude, and £18 to £20 per ton for refined.

PITCH.—There is still a good demand for prompt parcels, and full prices are being paid, but business is limited owing to the indifference of sellers for this position. For forward delivery business has been done at 75s. f.o.b. London, and 72s. 6d. f.o.b. East Coast, finishing rather with buyers than sellers at these prices.

Sulphate of Ammonia

There is no change in the price for the home trade, and the export demand is somewhat quiet.

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	8	to	0	1	10
Acetone oil	ton	77	10	0	to	80	0	0
Acetone, pure	ton	73	0	0	to	74	0	0
Acid, Acetic, glacial, 99–100%	ton	67	0	0	to	68	0	0
Acetic, 80% pure	ton	43	0	0	to	44	0	0
Arsenic, liquid, 2000 s.g.	ton	67	0	0	to	70	0	0
Boric, cryst.	ton	60	0	0	to	65	0	0
Carbolic, cryst. 39–40%	lb.	0	0	6	to	0	0	6½
Citric	lb.	0	2	3½	to	0	2	4
Formic, 80%	ton	65	0	0	to	66	0	0
Gallic, pure	lb.	0	2	11	to	0	3	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	40	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.	ton	30	0	0	to	31	0	0
Oxalic	lb.	0	0	8	to	0	0	8½
Phosphoric, 1.5	ton	38	0	0	to	40	0	0
Pyrogallic, cryst.	lb.	0	6	0	to	0	6	3
Salicylic, Technical	lb.	0	0	10½	to	0	1	0
Salicylic, B.P.	lb.	0	1	5	to	0	1	6
Sulphuric, 92–93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	6	to	0	1	6½
Alum, lump	ton	10	0	0	to	10	10	0
Alum, chrome	ton	28	0	0	to	29	0	0

	Per	£	s.	d.		£	s.	d.
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	10	10	0	to	11	0	0
Aluminium, sulphate, 17–18%	ton	11	10	0	to	12	0	0
Ammonia, anhydrous	lb.	0	1	8	to	0	1	9
Ammonia, .880	ton	33	0	0	to	35	0	0
Ammonia, .920	ton	21	0	0	to	23	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	74	0	0	to	75	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	42	0	0	to	44	0	0
Barium, carbonate, 92–94%	ton	12	10	0	to	13	0	0
Barium, Chlorate	ton	60	0	0	to	68	0	0
Barium Chloride	ton	22	0	0	to	22	10	0
Nitrate	ton	27	10	0	to	30	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	3
Bleaching powder, 35–37%	ton	12	0	0	to		—	
Borax crystals	ton	29	0	0	to	33	0	0
Calcium acetate, Brown	ton	9	0	0	to	9	10	0
" " Grey	ton	13	10	0	to	14	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	10	0	to	7	0	0
Carbon bisulphide	ton	50	0	0	to	52	0	0
Casein, technical	ton	47	0	0	to	55	0	0
Cerium oxalate	lb.	0	4	6	to	0	4	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	28	10	0	to	29	0	0
Cream Tartar, 98–100%	ton	115	0	0	to	117	10	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	68	10	0	to	70	0	0
Formusol (Rongalite)	lb.	0	2	6	to	0	2	9
Glauber salts, commercial	ton	5	10	0	to	6	0	0
Glycerine, crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	5	to	0	2	6
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	41	0	0	to	42	0	0
Carbonate (White Lead)	ton	42	0	0	to	46	0	0
Nitrate	ton	46	10	0	to	48	10	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	23	10	0	to	24	0	0
Magnesium chloride	ton	10	0	0	to	10	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	8	0	0	to	8	10	0
Sulphate (Druggists')	ton	13	10	0	to	14	10	0
Manganese, Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	60	0	0	to	62	0	0
Methyl acetone	ton	60	0	0	to	65	0	0
Alcohol, 1% acetone	ton	65	10	0	to	66	0	0
Nickel sulphate, single salt	ton	49	0	0	to	51	0	0
Ammonium sulphate, double salt	ton	51	0	0	to	52	0	0
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	6½	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride, 80%	ton	12	0	0	to	12	10	0
Chlorate	lb.	0	0	4½	to	0	0	5
Meta bisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	0	9	to	0	0	10
Prussiate, red	lb.	0	4	6	to	0	4	9
Prussiate, yellow	lb.	0	1	7	to	0	1	8
Sulphate, 90%	ton	13	0	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	5½	to		—	
Bisulphite, 60–62%	ton	23	0	0	to	24	0	0
Chlorate	lb.	0	0	3¾	to	0	0	4
Caustic, 70%	ton	20	10	0	to	21	0	0
Caustic, 76%	ton	21	10	0	to	22	10	0
Hydrosulphite, powder, 85%	lb.	0	1	9	to	0	2	0
Hyposulphite, commercial	ton	13	10	0	to	14	0	0
Sodium Nitrite, 96–98%	ton	31	0	0	to	32	0	0
Phosphate, crystal	ton	18	10	0	to	19	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	11½	to	0	1	0
Sulphide, crystals	ton	13	0	0	to	14	0	0
Sulphide, solid, 60–62%	ton	21	10	0	to	23	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	50	0	0	to	55	0	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	6	to	0	1	7
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	36	0	0	to	38	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	18	10	0	to	19	10	0

Coal Tar Intermediates, &c.

	Per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	1
Aniline oil, drums extra	lb.	0	1	0	to	0	1	1
Aniline salts	lb.	0	1	1	to	0	1	2
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	9	to	0	4	3
Benzidine, base	lb.	0	5	9	to	0	6	0
Benzidine, sulphate	lb.	0	5	9	to	0	6	0
Benzoic acid	lb.	0	1	7½	to	0	1	9
Benzoate of soda	lb.	0	1	6	to	0	1	7
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	4	9	to	0	5	0
Betanaphthol	lb.	0	1	4	to	0	1	4½
Betanaphthylamine, technical	lb.	0	6	0	to	0	7	0
Croceine Acid, 100% basis	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	2	3	to	0	2	6
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	6	to	0	7	0
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	3	0	to	0	3	3
Naphthionate of Soda	lb.	0	3	0	to	0	3	3
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	10	0	to	0	10	5
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	10	0	to	0	10	6
Para-amidophenol, hydrochlor	lb.	0	10	6	to	0	11	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	2	9	to	0	3	0
Resorcin, technical	lb.	0	5	6	to	0	6	0
Resorcin, pure	lb.	0	7	0	to	0	7	3
Salol	lb.	0	2	0	to	0	2	3
Sulphanilic acid, crude	lb.	0	1	0	to	0	1	1
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

Contracts Open

Tenders are invited for the following articles. The latest dates for receiving tenders are, when available, given in parenthesis :

REIGATE (July 31).—Portland cement. Particulars from F. T. Clayton, Municipal Buildings, Reigate.

PRESTWICH (July 24).—Pitch, creosote oil, prepared tar, cement. Particulars from M. A. Piercy, Town Hall, Prestwich.

LONDON (October 18).—Coal and ash handling plant. Particulars from High Commissioner for the Union of South Africa, Trafalgar Square, London, W.C.2.

PORTSMOUTH (July 24).—Pitch, tar, creosote oil, disinfectants, oils, paints, Portland cement. Particulars from Borough Engineer's Office, Town Hall, Portsmouth.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

GLASGOW, JULY 20, 1922.

THE amount of business transacted during the past week was small but a fair number of inquiries are in circulation and prices are well maintained.

Continental quotations are fairly steady, considering the unsettled financial conditions.

Industrial Chemicals

ACID ACETIC.—Prices are on about the same level as last week. Glacial 98/100 per cent., £65 to £67 per ton; 80 per cent. B.P. quality, £43 to £45 per ton; 80 per cent, technical, £38 to £39 per ton.

ACID BORACIC.—No change in price. Crystal or granulated. £60 per ton; powdered, £62 per ton.

ACID CARBOLIC.—Crystals quoted 6d. per lb. f.o.b. U.K.

ACID CITRIC.—Offered at 2s. 3d. less 5 per cent., c.i.f. U.K. port.

ACID HYDROCHLORIC.—Makers' price unchanged, 6s. 6d. per carboy ex works. Little demand.

ACID NITRIC, 80 PER CENT.—In little request, £25 to £26, ex works.

ACID SULPHURIC.—144°, £4 per ton; 168°, £7 5d. per ton. De-arsenicated quality £1 per ton more.

ALUM, LUMP POTASH.—Quoted £15 per ton spot delivery. Little inquiry.

ALUMINA SULPHATE, 17/18 PER CENT.—On offer at £9 per ton, c.i.f. U.K. prompt.

AMMONIA CARBONATE.—No change in price. Lump 4d. per lb.; powder, 4¼d. per lb. delivered.

AMMONIA LIQUID, 880°.—Offered at 3½d. per lb. ex works.

AMMONIA MURIATE.—Galvaniser's grey quality about £34 to £35 per ton; fine white quality, £30 per ton.

AMMONIA SULPHATE.—25¼ per cent., £14 10s. per ton; 25¾ per cent. neutral £15 3s. per ton, ex works, prompt.

ARSENIC, WHITE POWDERED.—Moderate inquiry. £44 per ton ex quay.

BARIUM CHLORIDE.—Little inquiry. Offered at £20 per ton c.i.f. U.K.

BARYTES.—Finest white English make, £5 5s. per ton ex works.

BLEACHING POWDER.—English make £13 per ton ex station. Very little inquiry.

BORAX.—Prices unchanged. Crystal or granulated, £29 per ton; powdered, £30 per ton.

CALCIUM CHLORIDE.—English makers' price, £6 10s., ex quay or station. Continental offers of £5 15s. c.i.f.

COPPER SULPHATE.—Moderate demand. Quoted at £26 per ton ex quay.

COPPERAS, GREEN.—In little demand. £4 per ton ex works, in full loads.

FORMALDEHYDE, 40%.—Quoted for forward delivery at £59 per ton c.i.f.; spot lots £69 to £70 per ton.

GLAUBER SALTS.—Moderate inquiry; £4 to £5 per ton, according to quality.

LEAD.—Red, £37 10s.; white, £50 10s. per ton delivered. A few inquiries for red.

MAGNESITE, GROUND CALCINED.—Moderate demand, £9 to £12 per ton ex store.

MAGNESIUM CHLORIDE.—Quoted £7 5s. per ton, spot delivery. Continental offers of £5 15s. c.i.f.

MAGNESIUM SULPHATE (Epsom Salts).—No change in price. Commercial, £7 10s. per ton; B.P., £9 15s. per ton.

POTASSIUM BICHROMATE.—Makers advise reduction of ½d. per lb. Now 6¼d. per lb. delivered.

POTASSIUM CARBONATE, 90/92%.—Spot lots about £29 to £30 per ton. Quoted £27 10s. per ton c.i.f., prompt shipment.

POTASSIUM CAUSTIC, 88/92%.—Spot lots about £34 per ton. Continental offers of £29 10s. c.i.f. U.K.

POTASSIUM CHLORATE.—Offered for forward delivery at 4d. per lb. c.i.f. U.K.

POTASSIUM NITRATE (Saltpetre).—Spot lots about £34 to £35 per ton.

POTASSIUM PERMANGANATE.—Quoted 9¼d. to 10¼d. per lb. delivered.

SODIUM BICARBONATE.—Refined quality, £11 per ton ex quay or station; m.w. quality, £10 per ton.

SODIUM BICHROMATE.—Makers advise reduction of ¼d. per lb. Now 5d. per lb. delivered.

SODIUM CARBONATE (Soda Crystals).—£6 10s. per ton ex quay or station.

SODIUM CARBONATE (Alkali, 59%).—£9 2s. 6d. per ton ex quay or station.

SODIUM CAUSTIC.—76/77%, £23 10s.; 70/72%, £21 10s.; 60%, £24 5s.; 98/99%, powdered, £27/28 per ton ex station.

SODIUM CHLORATE.—Continental offers of 99½% at 2¼d. per lb. c.i.f.

SODIUM HYPOSULPHITE.—Commercial quality about £13 10s. to £14 per ton. Pea crystals on offer from Continent at £13 per ton c.i.f. U.K., duty paid.

SODIUM NITRATE.—A few inquiries. £14 to £14 5s. per ton f.o.r. or f.o.b.

SODIUM SULPHATE (Saltcake 95%).—A few inquiries for export; £4 per ton f.o.b.

SODIUM SULPHIDE.—Cheap Continental offers of £17 per ton c.i.f. for 60/62% conc.

SULPHUR.—Government stocks of Sicilian thirds on offer at £4 5s. to £4 15s. per ton; Roll, £14; Rock, £13; Ground, £13; Flowers, £15. Prices nominal. Little demand for any quality.

TARTAR, CREAM OF.—Offered at £110 per ton, ex wharf, spot delivery.

ZINC CHLORIDE, 96/98%.—On offer for forward delivery at £22 per ton c.i.f.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ANTHRACENE, 93/95%.—Now offered at 9½d. to 10d. per unit, delivered.

BENZOL.—The market still remains weak, and prices are inclined to fall.

DIANISIDINE HYDROCHLORIDE.—Small inquiry. Quoted 20s. per lb. 100% basis, casks included.

DIMETHYLANILINE.—Some inquiries. Price still firm at 2s. 6d. per lb. delivered, in returnable drums.

DIPHENYLAMINE.—Small inquiry; price, 4s. 3d. per lb. delivered.

"H" ACID.—Several inquiries. Price still firm at 6s. 6d. to 6s. 7d. per lb. 100% basis, delivered.

PARA AMIDO PHENYL HYDROCHLORIDE.—Small inquiry. Price 8s. 8d. to 10s. per lb. delivered, 100% basis.

PARA AMIDO PHENYL SULPHATE.—Home inquiry. Quoted 5s. 6½d. to 5s. 8d. per lb. delivered, carriage paid, 100% basis.

PARADICHLORBENZOL.—Some inquiry for export. Price £35 to £40 per ton f.o.b.

PARANITRANILINE.—Small inquiry. Offered at 3s. 2d. per lb. ton lots; 3s. 3d. per lb. smaller lots, delivered.

TOLIDINE BASE.—Some inquiry. Price quoted, 7s. 9d. per 100% basis, casks inclusive.

TOLYL PERI ACID.—Some inquiry. Price 7s. 6d. per lb. 100% basis, delivered, packages included.

Indicator for Mine Gases and Petroleum Vapours

MR. L. H. MILLIGAN, assistant chemist of the Bureau of Mines, has been detailed to make experiments in calibrating the scale of the Burrell mine gas indicator to make it applicable for testing inflammable vapours in the petroleum industry. Considerable research work has previously been done in the gas laboratory and in the electrical section of the Pittsburgh, Pa., experimental station in developing a methane indicator. The indicator has finally been approved by the electrical section for use in mines. A technical paper will be prepared by Mr. Milligan on the subject of detectors for mine gases and petroleum vapours, information which is urgently needed at the present time.

German Chemical Trade Notes

(From Our Own Correspondent.)

Berlin, July 17, 1922.

The past week has seen an unprecedented depreciation in the German mark. In spite of this movement the actual business passing was confined to comparatively small orders, as holders were either not inclined towards heavier offerings, or their quotations were so high that the difference between the buyers' and sellers' prices was irreconcilable.

The demand for dyestuffs and pharmaceuticals as well as for some heavy chemicals has increased, and it is reported that considerable orders, some for forward delivery, have been placed from abroad with the German factories.

As far as can at present be ascertained, the negotiations between the English and the German dye industries have not proceeded any further.

It is expected that within the near future there will be a large trade opened with Russia.

On the coal tar products market feeling was rather unsettled, although prices are tending firmer and stocks and supplies are sometimes scarce.

The following quotations are given in marks per kilogram (d=domestic price; e=export price).

Acids: Acetic, 80%, is firm at 60 mk. d., and 65 mk. e; glacial, 98/100%, stands at 75 mk. d.; 85 mk. e. Boric is quoted at 90 mk. d. Formic, 85%, was urgently requested at 30/33 mk. d. Prices are expected to rise owing to scarcity. Muriatic—business is rather weak; prices advanced by about 5% as compared with the previous week. Oxalic was freely offered at 38/40 mk. d.; export lots were in good request at 69/75 mk. Salicylic—business was not quite so active, and ample supplies were available at 175/190 mk. d. and 200/220 mk. e. Tartaric, crystallised and powdered, 200 mk. d. 240 mk. e.

Industrial Chemicals: Alum, potash, crystal-powder was in fair request, 8/9 mk. d.; 12 mk. e.; lumps scarce at 12 mk. d.; 16 mk. e. Alumina Sulphate, 14/15% and 17/18%, moving along routine lines; some lots of 14/15% goods changed hands at 7/7.50 mk. d. and 8.50/9 mk. e.; 17/18 per cent. stood at 9/9.50 mk. d. and 12/13 mk. e. Bleaching Powder was in brisk demand, and considerable parcels were imported from abroad; domestic price, 10 mk. Borax, crystallised, was held at 44.50/46 mk. d. Chrome Alum, meeting with increased request at 37/40 mk. d.; 42/45 mk. e. Chrome Salts on the whole show no change. Cobalt Oxide was held at 1,400 mk. d. Copperas, 6.50 mk. e. Copper Sulphate, 98/100%, quoted at 30/40 mk. d.; 43 mk. e. Dextrine—small offers and a regular market maintained the price at 45 mk. d. Epsom Salt, increased demand and rising tendency; export material scarce at 6/7 mk. Glauber's Salt—offerings in excess of demand; domestic quotation 2.50/3 mk.; export price from 4/4.20 mk.; coarse crystallised, 10% higher. Glycerine, double distilled, chemically pure, 28° Bé. 95 mk.d.; 102 mk. e. Lead, red, in good demand at 48/50 mk. d.; 53/56 mk. e. Lead, white, was urgently requested, especially in oil; prices, 46/48 mk. d.; 49/51 mk. e. Sugar of Lead, 50 mk. d.; 56 mk. e. Litharge, 42/45 mk. d. Lithopone, Red Seal, was offered freely at 22/24 mk. d.; 26/28 mk. e.; Green Seal quoted at about 26/27 mk. d.; 30 mk. e. Potash Bichromate, 63 mk. d.; 83/90 mk. e.; demand is moderate, but works find great difficulty in covering even this reduced demand. Potash Carbonate, 29 mk. d.; 40 mk. e. Potash, Caustic, is quiet at 27 mk. d.; export trade more active at 38 mk. Potash Chlorate, 33 mk. d.; 39 mk. e. Potash Metabisulphite found increased demand, 50/52 mk. d.; 56/57 mk. e. Potash Permanganate, 73/93 mk. d.; 85/98 mk. e. Potash Prussiate, yellow crystallised, 200 mk. d. Potash Saltpetre, 34.50 mk. d. Salt Cake—there was improved demand at 2.50/3 mk. d.; 5.50/6.50 mk. e. Soda Ash—offerings were reluctant and price firm at 14/15 mk. d. Soda Bichromate, 76 mk. e. Soda, Caustic, is fetching 37 mk. d. Soda, Crystals, were suddenly off the market and were bought at 7 mk. d. Soda, Hyposulphite, is in good demand for export at 14.50/16 mk.; 12 mk. d. Soda Prussiate, yellow, 175 mk. d. Soda Sulphide has a quiet market; 30/32% is quoted at 11 mk. d.; 12/13 mk. e.; 60/62%, 22 mk. d.; 24/26 mk. e.; offerings ample. Water Glass, 38/40° B., 6.50 mk. e. Zinc, White, Red Seal is freely offered for domestic use at 48 mk.; 52/56 mk. e.

Carbonisation of Lignite

Arrangements have been made by the U.S. Bureau of Mines for experimental work in the carbonisation of lignite, to be performed during the summer at the University of North Dakota, Grand Forks, No. Dak. The work will consist of experiments in making lignite char, used for domestic fuel, without briquetting or further treatment. Mr. W. W. Odell, fuel engineer, will represent the Bureau of Mines in this work.

U.S.A. Dyestuffs Output for 1921

From the preliminary summary of the "Census of Dyes and Coal-Tar Chemicals, 1921," issued by the U.S.A. Tariff Commission, it appears that the total production of intermediates in 1921 by 107 different manufacturers was 70,899,912 lb., a decrease of 73 per cent. in quantity from the 1920 output. The total sales in 1921 were 33,637,326 lb., valued at $8,483,463.

The number of intermediates reported in 1921 was 232, as compared with 236 in 1920. Of the total number reported in 1921, 49 were mentioned for the first time. The Commission points out that the large decrease in the 1921 production of intermediates may be attributed to the following causes: (1) The loss of most of the U.S.A. export trade in dyes, (2) the large stocks carried over from the previous year, and (3) the general business depression. In general, the intermediates used in producing those dyes consumed in the largest quantity show the greatest reductions.

Dyes and Finished Products

Dyes.—The domestic production of dyes in 1921 by 74 manufacturers totalled 39,008,690 lb., a decrease of 56 per cent. from that of 1920. The sales during 1921 totalled 47,513,762 lb., with a value of $39,283,956. The sales exceeded the production by 22 per cent., indicating that a part of the domestic consumption for that year was supplied from stocks carried over from the previous year's abnormal production. The average sales price of dyes for 1921 was 83c. per lb., compared with $1.08 for 1920 and $1.07 for 1919.

The production of dyes in 1921, grouped by classes according to method of application, is as follows: Acid dyes, 7,751,698 lb., or 19.87 per cent. of the total production; basic dyes, 1,852,243 lb., or 4.75 per cent.; direct cotton dyes, 6,787,634 lb., or 17.4 per cent.; sulphur dyes, 10,239,255 lb., or 26.25 per cent.; vat dyes, including indigo, 7,019,120 lb., or 17.99 per cent; the vat colours being divided as follows: Indigo, 6,673,938 lb. and other vats 345,152 lb.; mordant and chrome colours, 3,773,438 lb., or 9.67 per cent.; lake and spirit soluble dyes, 697,444 lb., or 1.79 per cent.; unclassified dyes, 887,858 lb., or 2.28 per cent.

Colour Lakes.—The total output by 43 firms of this class of pigments was 6,152,187 lb., compared with 10,983,538 lb., valued at $5,871,820 in 1920. Total sales of colour lakes for 1921 amounted to 6,424,612 lb., valued at $2,863,189.

Photographic Chemicals.—The production by five firms of coal-tar chemicals used as photographic developers totalled in 1921, 183,798 lb. compared with 440,759 lb. in 1920. Sales during 1921 amounted to 170,221 lb., valued at $248,041.

Medicinal Chemicals.—During 1921 conspicuous progress was made in the development of synthetic medicinals of coal-tar origin. The total production for 1921 was 1,545,917 lb., including a small quantity of disinfectants, the sales amounting to 1,876,246 lb., valued at $2,930,324. The 1920 production, including a considerable quantity of disinfectants, was 5,184,989 lb., valued at $5,726,776. Total production figures for 1920 and 1921 are, however, not strictly comparable, owing to the large quantity of disinfectants of a relatively low value reported in 1920 and the small quantity of this group reported in 1921.

Perfumes and Flavours.—The total output of flavours by 17 firms in 1921 was 901,245 lb., compared with 166,884 lb. in 1920. Sales for 1921 amounted to 933,662 lb., valued at $1,002,018. The production of perfumes by 15 firms in 1921 was 119,335 lb., compared with 99,740 lb. for the previous year. Sales in 1921 amounted to 119,691 lb., valued at $175,815.

Synthetic Phenolic Resins.—These products are used as substitutes for amber in making pipestems and similar articles, electrical insulators, varnishes and lacquers. The 1921 production by three firms was 1,643,796 lb., compared with a production of 4,659,680 lb. during the previous year. Sales in 1921 amounted to 1,674,456 lb., valued at $1,352,166.

Synthetic Tanning Materials.—The output of these products by four firms amounted to 1,902,597 lb. in 1921, compared with 3,142,861 lb. in 1920. The sales were 1,721,359 lb., valued at $141,005, during 1921.

Company News

COURTAULDS, LTD.—An interim dividend of 1s. 3d. per share, free of tax, is payable on August 3.

BROKEN HILL SOUTH.—August 18 is the date on which a dividend of 2s. per share is payable.

MIAMI COPPER CO.—It is announced that a dividend of 50 c. per share will be paid on August 15 in respect of the last quarter.

ALLEN-LIVERSIDGE, LTD.—Payable on August 15, an interim dividend for the six months ended April 30 has been declared at the rate of 7 per cent. per annum, less tax.

ANGLO-CONTINENTAL GUANO WORKS.—The directors recommend the payment of a full year's dividend on the ordinary shares at the rate of 5 per cent. per annum for the year ended December 31 last.

BRITISH OXYGEN CO., LTD.—A final dividend is announced for the year ended March 31 of 1s. 4d. per share, free of tax, payable on July 31. This makes a total for the year of 10 per cent., free of tax.

BRITISH OIL AND CAKE MILLS, LTD.—It is officially announced that a provisional arrangement has been made whereby the company will absorb the Hull Oil Manufacturing Co., Ltd. It is anticipated that if the deal is completed important crushing and soap-making developments will result.

DISTILLERS CO., LTD.—At the annual meeting in Edinburgh on July 14 it was stated that a provisional arrangement had been concluded with the Distillers' Finance Corporation, Ltd., Belfast, whereby the Distillers' Co. agreed to buy the ordinary shares of the corporation at a price of rather under £3,000,000. The transaction, the Chairman stated, would be concluded by August 31, if 76 per cent. of the Distillers' Finance Corporation accepted.

BRITISH CYANIDES CO., LTD.—The report for the year ended April 30, 1922, shows profit, including sum agreed in settlement of petition of right, of £2,383, after charging all outgoings and allowing for depreciation, plus £958 brought forward. The directors recommend a dividend on the preference shares, carrying forward £192. The directors state that they have opened up a new branch of the business in merchanting foreign chemicals. Although heavy expenses have been incurred in this new departure, the profits earned have been sufficient to cover those expenses, and during the current year they should leave a satisfactory margin in favour of the company. The annual meeting will be held at Cannon Street Hotel, London, on July 26, at noon.

BRITISH BROKEN HILL PROPRIETARY CO., LTD.—The report for 1921 states that, after charging all administration expenses and allowing for depreciation on plant and machinery, a loss is shown of £30,881. Deducting this from the credit balance brought in, there remains £92,023. The liquid assets, including investments, mine products and stores at cost, and deducting liabilities, amounted on December 31 to £209,225. As a result of the fire at the Broken Hill Associated Smelters Works at Port Pirie, and other causes, productive operations were suspended for practically the whole of the period. Mining and milling were resumed on December 12 last. The ore reserves as at December 31, 1921, are estimated at 1,092,226 tons, assaying approximately 7 oz. Ag., 13 per cent. Pb., 11.6 per cent. Zn. The annual meeting will be held at Winchester House, London, on July 25, at noon.

MOND NICKEL CO., LTD.—The accounts to April 30 cover two years and show that the profit for the year ended April 30, 1921, amounted to £222,630, and for the succeeding year to £299,042. After deducting directors' fees, and including £114,795 brought forward, a balance remains of £610,383. Dividends declared and paid in respect of the former year amounted to £220,000, the dividend on the preference capital for the latter year to £175,000, and an interim ordinary dividend of 6d. per share was paid, free of tax, on March 3 last, absorbing £22,500. It is now proposed to pay final dividends on the cumulative and non-cumulative preference shares of 3½ per cent., less tax, making 7 per cent. for the year ended April 30 last and on the ordinary capital of 1s. per share, free of tax, making 1s. 6d. for the year. After deducting income-tax, £110,000, a balance of £37,883 is carried forward.

NIGER CO., LTD.—A debit balance of £836,701 is shown in the accounts and the directors explain that this loss is shown after taking credit from the general reserve of £1,300,000 and the balance of £460,520 carried forward. The total net loss met, therefore, amounted to £2,597,221. This heavy loss, it is stated, has been caused by the unprecedented fall which took place in the value of West African produce and trading goods. The directors have made a revaluation of the assets of the company, and state that they are satisfied that the figures in the balance-sheet now represent the true value of the assets. These accounts cover two years, none having been issued since the publication of the balance-sheet and profit and loss account for the year 1919. On the present occasion no profit and loss account is submitted. The annual meeting will be held at the Cannon Street Hotel, London, on July 24 at 11 a.m.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIAL.	REF. NO.
San Francisco	Linseed oil	78
Costa Rica ..	Chemicals and drugs ..	83

Tariff Changes

SPAIN.—A Customs duty of 85 pesos per 100 kilogs net is levied on glucose, liquid caramel and similar products.

CANADA.—Negotiations are in progress with Canada and New Zealand for reciprocal tariff arrangements.

POLAND.—A modification in the export duty on crude mineral oil makes the present rate 15 Polish marks per kilogram.

AUSTRALIA.—The deferred duty on citric acid which was to have come into operation on June 30, has been postponed until September 30.

FRENCH COLONIES.—The exportation and re-exportation of opium, products containing opium, morphine, cocaine and their respective salts, is prohibited.

UNITED STATES OF AMERICA.—Copies of the new Narcotic Drugs Act are available for inspection at the Tariff Section, Department of Overseas Trade, 35, Old Queen Street, London.

SERB-CROAT-SLOVENE KINGDOM.—As from July 1 a new scale of monopoly duties is leviable on explosives. Particulars are obtainable from the Tariff Section, Department of Overseas Trade, 35, Old Queen Street, London.

CANARY ISLANDS AND SPANISH NORTH AFRICA.—The prohibition on the importation into the Free Ports of the Canaries and into Ceuta and Melilla of goods originating in France, the French Colonies and Protectorates, is now withdrawn.

FRANCE.—Pure nickel in the form of irregular balls of varying diameters, which, on being broken by the hammer, show successive concentric layers, is now regarded as falling under the tariff heading "nickel, pure, refined, in ingots or crude lumps."

CHILE.—Proposed export duties on copper and iron ores were published in the Board of Trade Journal of July 13 (p. 55). In the case of copper ores the export duty is to be assessed on the fine copper content, in accordance with a scale included with the notice.

The New A.B.C.M. Chairman

MR. MAX MUSPRATT, chairman of the United Alkali Co., Ltd., has been appointed Chairman of the Association of British Chemical Manufacturers for the ensuing year. An original member of the Association, he has rendered valuable service in its development. Mr. Muspratt has served as Vice-Chairman during the past two years. He is also Vice-Chairman of the National Sulphuric Acid Association, Ltd., a body which is affiliated to the Association of British Chemical Manufacturers.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.

BLOOMSBURY GLASS WORKS, LTD., Belmont Works, Maidenhead, glass manufacturers. £10 18s. 11d., May 11; and £31 13s. 10d., May 25.

BLUNT, H. Rowland, 70, Snow Hill, Birmingham, chemist. £11 13s. 8d. May 15.

BLUNT, W. H. and Son, 70, Snow Hill, Birmingham, wholesale druggists. £23 4s. 11d. May 18.

BRITISH PEROLIN CO., LTD., 44, George Street, Baker Street, London, W., chemists. £16 5s. 5d. May 5.

CARTER, N. C., 274, High Road, Tottenham, London, N., druggist. £16 1s. 10d. May 24.

DRAKE, KENDALL AND CO., LTD., 29, Seymour Place, London, W., veterinary chemists. £30 3s. May 19.

FIELD, W. G., Imperial Works, 2, Evelyn Street, Rotherhithe, chemical merchant. £20 7s. 6d. May 9.

FITCH, W. B., 143, High Street, Rochester, chemist. £12 12s. May 26.

HARDMAN, James, 31, Wellington Street, Farnworth, soap manufacturer. £69 10s. 7d. May 17.

SLEATH, B., 190, Avenue Road, Acton, chemical merchant. £15 6s. 10d. May 10.

STYLES, W. H., 17, Castle Street, Beaumaris, chemist. £10 1s. May 17.

TURNER BROTHERS, 20, Orchard Street, Bristol, chemists. £14 18s. 4d. May 19.

VARKER, B. S., 16, Canning Street, Cwm, chemist. £18 11s. 9d. May 12.

VICTORS, LTD., Grosvenor Hall, Deansgate, Manchester, chemical manufacturers. £124 14s. 8d. May 3.

WATSON, J. W., 93, High Street, Weston-super-Mare, chemist. £18 19s. 4d. May 9.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*

NATIONAL BY-PRODUCTS, LTD., London, W.C.—— Registered July 7, £3,900 debentures; charged on freehold property at Grately, with factory and buildings and company's interest in certain premises at Aldershot, also general charge.

NAYLOR BROTHERS (LONDON), LTD., Slough, varnish and japan manufacturers.—Registered July 3, £800 mortgage, £300 mortgage, £550 mortgage, £500 mortgage. *£68,950. July 1, 1921.

REES (ARTHUR), LTD., London, W.C., chemists.—Registered July 4, £1,000 debenture, to Branch Nominees, Ltd., 15, Bishopsgate, E.C.; general charge.

RIGBY (J. J.), LTD., Salford, soap manufacturers.—Registered July 4, deed increasing rate of interest on mortgage dated December 18, 1900, and supplemental deed dated June 18, 1918, to Refuge Assurance Co., Ltd., Manchester; charged on properties, etc., comprised in prior deeds. *£4,000. August 3, 1921.

Satisfaction

NAYLOR BROTHERS (LONDON), LTD., Slough, varnish manufacturers.—Satisfaction registered July 10, all moneys, etc., registered January 9, April 7, and May 29, 1920.

London Gazette

Bankruptcy Information

CARRERAS, A., and E. (a firm), late 207, King Street, London, W.C., tooth paste manufacturers. Receiving order, July 11. Creditor's petition.

Winding-Up Petition

BRITANNIA FERTILISER CO., LTD.—A petition for winding-up has been presented by S. G. Hayes, 139, Ilford Lane, Ilford, Essex, a creditor, and is to be heard at the Royal Courts of Justice, Strand, London, Tuesday, July 25.

Companies Winding up Voluntarily

BRITISH-AMERICAN SULPHUR CO., LTD. W. W. Clarke, 35, New Broad Street, London, E.C., appointed liquidator. Meeting of creditors at the liquidator's office, July 24, at 11 a.m.

KNOWLES OXYGEN CO., LTD. F. D'Arcy Cooper, 14, George Street, Mansion House, London, E.C.4, appointed liquidator. Meeting of creditors at the offices of the liquidator, Tuesday, July 25, at 12 noon.

Notice of Intended Dividend

THOMPSON, William Goulden, 25, Manchester Road, Chorlton-cum-Hardy, Manchester, aniline merchant. Last day for receiving proofs, August 2. Trustee, J. G. Gibson, Byrom Street, Manchester.

Edinburgh Gazette

ROBERTSON, Thomas, and ROBERTSON, Mrs. Sarah (trading as THE OZOBRITE CO.), chemical manufacturers, 43, Wellington Street, Greenock. A petition for sequestration has been presented.

New Companies Registered

M. RENIER AND CO., LTD., Gloucester Mansions, Cambridge Circus, London. Manufacturing chemists, etc. Nominal capital, £1,000 in £1 shares (500 10 per cent. cumulative participating preference).

ERADICUS, LTD., 4, Lime Street, London. Manufacturers of and dealers in chemical preparations, drugs, etc. Nominal capital, £2,500 in 2,450 ordinary shares of £1 each and 1,000 "A" shares of 1s. each.

FADEPROOF FABRICS, LTD., 275, Regent Street, London. Manufacturers of dyes, etc. Nominal capital, £250 in £1 shares.

METAL AND IRON CO., LTD., 20, Copthall Avenue, London. Dealers in chemicals, alloys, etc. Nominal capital, £3,000 in £1 shares.

NATIONAL SMOKE PURIFYING CO., LTD., 50, Bedford Row, London. Dealers in carbon, sulphur, etc. Nominal capital, £25,000 in £1 shares.

BOOTHWOOD PAPER MILLS, LTD., Boothwood Paper Mills, Rishworth, Halifax. Paper manufacturers. Nominal capital, £30,000 in £1 shares (10,000 7 per cent. cumulative preference and 20,000 ordinary).

CHEMICAL UTILITIES, LTD., 50, Linsdell Road, Barking. Manufacturers of and dealers in chemical, pharmaceutical, industrial and other preparations. Nominal capital, £500 in £1 shares.

G. F. M. SYNDICATE, LTD., 6, Eldon Street, London. Oil extractors, merchants, etc., manufacturing chemists and candle makers, etc. Nominal capital, £3,500 in 3,000 cumulative preference shares of £1 each and 10,000 deferred shares of 1s. each.

MEDINA REFINERY, LTD. Oil refiners and distillers, manufacturers of soap making materials and other products from oil residues and refinings, etc. Nominal capital, £3,000 in £1 shares.

J. R. MARSDEN AND CO., LTD, 4, Butts Court, Leeds.—Manufacturers of and dealers in chemicals, etc. Nominal capital, £2,000 in £1 shares.

NEW BRITANNIC CHEMICAL CO., LTD., 12, Charterhouse Square, London. Chemical manufacturers, etc. Nominal capital, £20,000 in £1 shares (2,500 10 per cent. preferred, 5,001 ordinary "A" and 12,499 ordinary "B.")